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OPTIONS FOR IMPROVING GOVERNMENT PROGRAMS THAT COVER CROP LOSSES CAUSED BY NATURAL HAZARDS

Thomas A. Miller and Alan S. Walter

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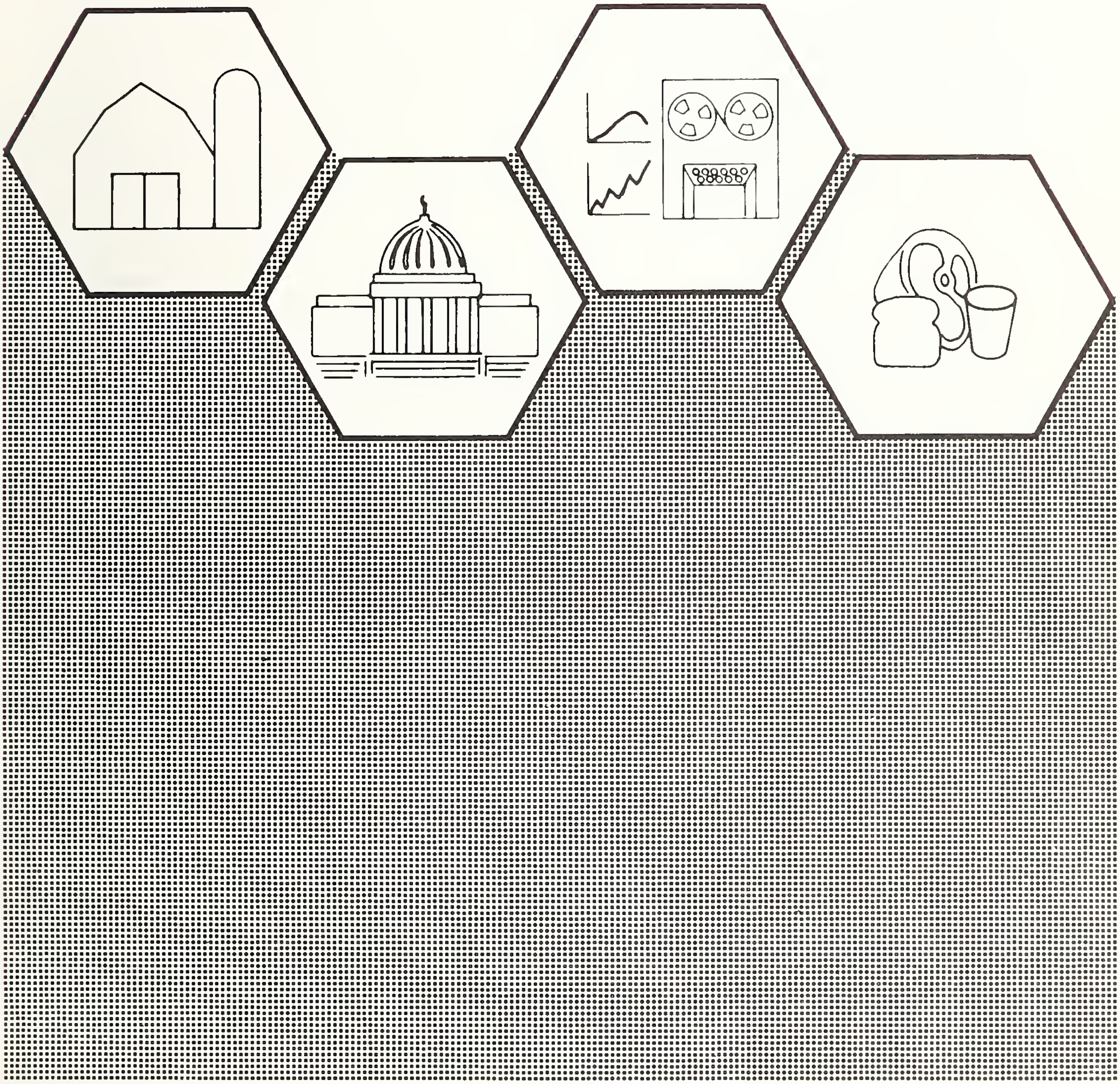

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OPTIONS FOR IMPROVING GOVERNMENT PROGRAMS THAT COVER CROP LOSSES CAUSED BY NATURAL HAZARDS, by Thomas A. Miller and Alan S. Walter, Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. ERS-654.

ABSTRACT

The major problem areas of private and Federal programs to protect producers from loss of income due to crop damage by natural disasters are identified, and policy options for handling these problems are developed. Options are evaluated on the basis of protection provided and the costs and benefits to farmers and taxpayers. Analysis of these options provides policymakers with a wide range of alternatives concerning the level of protection to provide producers. The analysis shows that the cost of these programs generally increases with the level of protection provided.

KEYWORDS: Agricultural and food policy, risk, crop insurance, disaster payments.

This report is one in a series of policy issue papers which provides analytical descriptive treatments of topical issues, development of policy and program concepts, and evaluation of program alternatives relevant to agricultural and food policies and programs. The previous policy issue papers were "Impacts of Reverting to Basic Legislation when the Agricultural and Consumer Protection Act of 1973 and Rice Production Act of 1975 Expire," ERS-641; and "Use of Land Reserves to Control Agricultural Production," ERS-635.

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CONTENTS

Page

Glossary iv

Summary vii

Introduction 1

The Nature and Insurability of Crop Risks 1

Current Situation 2

- Disaster Payments 2
- Federal Crop Insurance Issues 7
- Federal Programs and Private Industry 7

Policy Options 7

Extension of the Current Programs 8

- Impacts of the Current Programs on Farms 9
- Expected Costs of Current Programs 13

National Crop Insurance With a Premium Subsidy 16

- Increased Sales Activity to Expand Participation 16
- Impact of a Premium Subsidy on Participation 16
- Estimated Coverage and Costs 18

Aid to the Private Insurance Industry 20

- A Federal Crop Insurance Corporation Reinsurance Program 20
- Subsidies for Private Industry 21

Possible Improvements in the Disaster Payments Program 21

- Alterations for the Disaster Payments Program 22
- Impact of a Modified Disaster Payments Program on Farms 24
- Costs and Coverage of a Modified Disaster Payments Program 26
- Decrease in the Protection Level 27
- Revision of Allotments and Bases 27

Limiting Overlap Between Federal Crop Insurance and Disaster Payments 28

- Methods of Eliminating Overlap 28
- Estimated Coverage and Costs of Limited Disaster Payments 30

Welfare Implications of Premium Subsidies and Disaster Payments 30

Conclusions 31

References 34

GLOSSARY

Actual Yield. Actual yield is equal to production per planted acre.

Actuarially Sound Program. An actuarially sound program is one in which premiums can be estimated and set at a level that covers expected losses and operating costs.

Allotments. Allotments are historically evolved acreages allocated to individual farms for use under federal farm programs. The allotment represents the maximum acreage of a farm that is covered under those programs. National allotments have often been adjusted to meet changes in demand. Individual farm allotments have remained tied to historical bases from 15 or more years ago.

All-Risk Insurance. All-risk insurance is presently offered by FCIC. As opposed to multiple-peril insurance, the risks are not named. Premiums are based on county average yields, the loss history, and other factors.

Disaster Payment. A disaster payment is paid to those farms determined to be eligible on the basis of their computed disaster yield. The disaster payment is defined as the difference between the actual yield per planted acre (less than or equal to allocated acres) and the established yield times the payment rate. The literature also refers to this as the low-yield payment. The disaster payment is limited to $20,000 per farm under the 1973 Act.

Disaster Payments Program (DPP). The DPP is administered by the Commodity Credit Corporation. It is authroized by the Agriculture and Consumer Protection Act of 1973, as amended (Public Law 93-86, 84 Stat. 1358). Cotton, wheat, feed grains, and rice are covered by the program. The intent of the program is to alleviate income losses incurred by producers who are prevented from planting the specific crops, or who obtain low yields from such planted crops because of drought, flood, or other natural disasters and conditions beyond their control. The DPP is a direct payment program.

Disaster Yield. The disaster yield, or disaster program yield, is the yield established for the farm on the basis of the 10-year average yield for the county. It is adjusted to reflect the productivity of the individual farm. It is used to determine eligibility for the DPP.

Economically Sound Program. An economically sound program implies that the program is actuarilly sound and the premiums are affordable by the producer.

Established Yield. Established or payment yield is computed annually for the farm by the Agricultural Stabilization and Conservation Service county committee. This yield is based on the projected county yield for the commodity, adjusted for the farm's productivity. The projected county yield is based on the yield established for the county for the previous crop year with adjustments to reflect yield trends, fertilizer use, and other technical factors.

Federal Crop Insurance (FCI). FCI is a voluntary insurance program administered by FCIC. Unavoidable losses due to adverse weather, insect infestation, and plant insurance is not available in all counties or for all crops in a county. FCIC has authority to refuse insurance in areas where risks are excessive. Premiums are calculated on an actuarial basis given the type of crop, risks in the area, and amount of insurance protection for each acre. Coverage is limited to no more than 75 percent of the farm's average yield and can not be greater than the per acre production costs in the area.

Federal Crop Insurance Corporation (FCIC). The FCIC was created under Title V of the Agricultural Adjustment Act of 1938. It is authorized to insure crops against unavoidable losses because of a wide variety of causes, and also to determine insurance plans, terms, and conditions of insurance for agricultural commodities.

Moral hazard. "Moral hazards" involve a personal factor in management or decisionmaking by the producers being insured. Insurance is generally not provided for such hazards because the availability of coverage tends to influence the behavior of the insured--they are induced to sustain the loss and obtain the insurance payment rather than attempt to minimize the loss.

Multiple-Peril Insurance. In an insurance plan of this type the risks to be covered are specifically named and defined in the policy. Premiums for this type of insurance are based on the actuarial data of the type of named risks.

Nonconserving Crops. ASCS defines a nonconserving crop as follows: feed grains, wheat, upland cotton, or any other annual crop intended for harvest or used in any feed form. The exceptions are annual grasses, legumes, immature small grains other than barley or wheat destroyed by any means or used for other than grain.

Payment Rate. The payment rate is one-third of the farm program target price for the crop involved.

Prevented Planting Provision. This provision is part of the DPP. The provision states that if the Secretary determines that a producer is prevented from planting any portion of his allotment to a program crop or other nonconserving crop because of drought, flood, natural disaster, or conditions beyond his control, he is eligible for disaster payments as established. The phrase "or other nonconserving crop" is stricken from the provision for cotton.

Reinsurance Program. A reinsurance program, in the sense it has been used in this paper, is an agreement between FCIC and a private (or mutual) insurance company, whereby the FCIC would assume that portion of the risk that could not be assumed by the private (or mutual) insurance company. A percentage of the premium is paid to FCIC in relation to the amount of excess risk it assumes. Currently, a reinsurance program for crop insurance is not operating.

Target Price. Target prices were set by the Agriculture and Consumer Protection Act of 1973. Target adjustments are based on the prices paid for production items by farmers and the individual crop yields. The purpose for instituting the target price concept is to establish a basis for support payments, should the market determined price fall below an acceptable level.

SUMMARY

A current issue in agriculture is the proper role of Government in protecting agricultural producers financially against crop destruction resulting from natural disasters. Of particular interest is the adequacy of the Federal programs and the overlap between them. This paper examines the 1974-75 record of risk protection coverage and indemnities paid to farmers by the private agricultural insurance industry, the Federal Crop Insurance Corporation (FCIC), and the Disaster Payments Program (DPP) established by the Agriculture and Consumer Protection Act of 1973. It also examines the relationship of Government programs to general insurance principles, identifies problems with Federal programs, and evaluates public policy options to correct those problems. Expected costs and coverage provided by several options are also presented.

Federal disaster programs supplement the hail coverage offered by private companies. Private companies limit their crop coverage to hail because it is a risk that they can bear with limited reserves. FCIC offers coverage which generally cannot be provided by private companies due to the possibility that unfavorable weather over a large area could exhaust their reserves. The DPP extends coverage for other categories of risk, and also coverage to high-risk areas where Federal Crop Insurance is not available.

Most of the payments during 1974-75 under the DPP were made in counties where Federal Crop Insurance was available, but indemnities in counties without FCIC coverage averaged $86 million and exceeded total FCIC loss payments by 60 percent. DPP payments were more than double the indemnities from private companies and averaged $420 million for this period.

The DPP fulfills a major need by providing coverage that would not be assumed by private companies or FCIC without Government subsidies. The program has inconsistencies and inequities in several key provisions. Insurance of prevented planting creates the potential for abuse. Cotton producers have coverage more favorable than that for wheat or feed grain producers. Indemnities do not reflect the timing of the loss to the advantage of those who are prevented from planting or have a disaster early in the growing season. Also, the criteria for determining eligibility for payments allow a small change in production to be the determinant of a great change in benefits received. Basing coverage on acreage allotments means that an acreage base that does not reflect current cropping patterns is used. Furthermore, DPP coverage is based upon production per harvested acre that does not include usual crop abandonment rates. Overlap between the DPP and the FCIC is a potential problem. But the availability of the DPP did not appear to impinge on sales of Federal Crop Insurance in 1974-75.

Major weaknesses of the FCIC program include the low level of participation (17 percent of eligible acreage in 1976), and the exclusion of large areas from the program.

A number of options are available to policymakers for assuring that producers receive protection against crop losses resulting from natural hazards. These options are not mutually exclusive, and the policy chosen may involve a combination of the individual options.

A first option is simply the continuation of current programs--the DPP and the FCIC without modification. Although this extention would do nothing to alleviate any current problems with the programs, it would continue protection to many farmers in high-risk areas who cannot obtain FCIC coverage. This option also provides a basis to compute other options. It is expected that the cost of this option for the DPP would average about $330 million per year based on 1976 acreage and payment rates.

A second option is to subsidize the private insurance industry that would then provide the coverage. This subsidy would include a reinsurance program and a payment of part of the premium. A reinsurance program alone would not likely expand the level of coverage used by producers. A superficial analysis suggests that it may be less costly for the Government to provide coverage through FCIC by subsidizing the private insurance industry.

A third option is a premium subsidy for a national crop insurance program and a discontinuation of the DPP. In addition, FCIC would expand its currently limited activities to promote and solicit sales. The premium subsidy and an expanded sales effort should increase FCIC participation. It is estimated that a 25-percent premium subsidy in conjunction with an expenditure of $16 million would increase FCIC participation to 40 percent of the acreage. Indemnities to producers would average $163 million and Government costs would average $97 million. Alternatively, a program with a variable subsidy of 25 percent of the premium cost up to 8-percent liability--but 40 percent above the 8-percent liability and a $30-million expenditure on sales activities--would result in covering 47 percent of the acreage. Producer indemnities would average $189 million and Government costs would average $126 million.

Modification of the DPP is a fourth option. Suggested modifications include eliminating the prevented planting coverage, lowering the yield on which payments are based, increasing the payment rate, changing the payment formula to cover operating expense, and accounting for actual crop market prices when computing payments. The Government cost of this program would not significantly differ from costs of a continuation of the present program if market prices are at or below the target levels. Costs would be significantly lower if market price exeeded target levels, as they have in the past few years.

Another modification that could be made as part of the last option is the updating of allotments and bases to reflect current planting patterns. Government costs could increase by over $100 million for wheat, corn, grain sorghum, and barley coverage. The increase in costs for cotton is unknown.

Costs of the program could be lowered by reducing the levels of coverage or by eliminating the overlaps between the FCI and the DPP. One way of eliminating overlap would be to limit the DPP to areas without FCIC coverage. Government costs under this option, which would include a 25-percent premium subsidy in areas where crop insurance is offered and a restructured DPP in the high-risk areas, would average $147 million.

OPTIONS FOR IMPROVING GOVERNMENT PROGRAMS THAT COVER CROP LOSSES CAUSED BY NATURAL HAZARDS

Thomas A. Miller and Alan S. Walter[1]

INTRODUCTION

Legislative proposals changing the Disaster Payments Program (DPP) and Federal Crop Insurance program are being discussed. This report presents background information and analyses of policy options for alternative Government programs that would reduce the impact of natural disasters and consequent crop losses on agricultural producers. The nature and insurability of crop risks are examined. The current status of the DPP, the Federal Crop Insurance Corporation (FCIC), and the 1974-75 crop insurance experience of the private insurance industry are examined. Specific problems with the current mix of programs are identified. The major policy options available to decisionmakers regarding the provision of disaster protection are described. Last, a detailed evaluation of these policy options on the level of protection, program costs, and other impacts of these options is presented.

THE NATURE AND INSURABILITY OF CROP RISKS

Agricultural risks range from those ideally suited for insurance to those that cannot be covered by an actuarially sound insurance program. Risks ideally suited for insurance are random over time and geographic area, have limited liability, cannot be affected by management choices, and have a clearly identifiable loss. A brief description of four types of agricultural risks and their insurability provides a framework for evaluating the 1974-75 situation (8, 15). 2/

The hail risk meets the requirement of insurability better than any other hazard. Hail losses on one farm are nearly independent of hail losses on other farms, and hail losses in one year are unrelated to hail losses the following year. The event is identifiable, is not subject to any control or action by the farmer, and occurs

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1/ Thomas A. Miller and Alan S. Walter are agricultural economists in the Agricultural Policy Analysis Program Area, Commodity Economics Division, Economic Research Service at Colorado State University, Fort Collins, and Washington, D.C., respectively.

2/ Underscored numbers in parentheses refer to references listed at the end of this report.

frequently enough to make farmers willing to pay a fair premium for insurance coverage. Due to this insurability, crop hail hazards have traditionally been insured by the private industry.

A second category of risks are other natural hazards that affect growing crops. These risks are less insurable, primarily because such hazards tend to affect large numbers of farmers in a given year. The incidence of drought is not independently distributed among farmers. From an insurance standpoint, this means that there is a probability in each year for a catastrophic loss covering many farmers. Although it may be possible for premiums to equal losses over a period of years, the year-to-year variability in losses makes it difficult for the private insurance industry to provide "all-risk" crop insurance. The Federal Crop Insurance Corporation was formed to provide such coverage.

A third category of risk is the production of crops in areas where the probability of crop failure is high. With this type of risk the variability and frequency of crop losses are so large that insurance coverage simply cannot be provided on an economic basis at a premium that farmers can afford. The Federal Crop Insurance Act allows FCIC to refuse insurance to any county, to any area within a county, or even to an individual farm that could be subject to such a high risk. As a result, coverage is not provided for areas where the insurance experience has been so unfavorable as to preclude operation of a sound program. An example of the exclusion of a high risk area is the 1955 FCIC action to eliminate coverage in 14 counties of Colorado, New Mexico, and Texas, as a result of high loss experience from a prolonged drought.

A fourth category of risk, one that neither the insurance industry nor FCIC will insure, is referred to as "moral hazards". Such hazards involve a personal factor of management or decisionmaking by the insured. Either the quality of management can affect the amount of loss incurred or the actual event is a management decision. Insurance is generally not provided for such hazards because the availability of coverage tends to influence the behavior of the insured--they are induced to sustain the loss and obtain the insurance payment rather than attempt to minimize the loss.

For these four types of agricultural risks, the hail hazard is the most insurable because of its identifiable characteristics and random and independent loss nature. The risks referred to as "moral hazards" are the least insurable on the basis of the preceding criteria. In between these two extremes are the second and third risk categories. Whether such risks are insured will depend upon the nature of the insurance program.

CURRENT SITUATION

Disaster Payments

The Agriculture and Consumer Protection Act of 1973 contains a set of provisions intended to reimburse farmers for a portion of income losses due to crop failures. For example, the wheat section of the act reads in part:

> If the Secretary determines that, because of such a disaster or condition, the total quantity of wheat (or other nonconserving crop planted instead of wheat) which producers are able to harvest on any farm is less than 66-2/3 percent of the farm acreage allotment times the projected yield of wheat (or other nonconserving crop planted instead of wheat) for the farm, the rate of payment for the deficiency in production below 100

> percent shall be the larger of (a) the foregoing rate or (b) one-third of the established price. 3/

This is the "low-yield payment" part of the 1973 Act. An additional "prevented planting provision," which operates in a similar manner, is also contained under disaster payments for each of the covered crops (wheat, corn, grain sorghum, barley, and upland cotton).

The Disaster Payments Program represented a new plan for aiding farmers experiencing income losses due to crop failures. It is a form of free "insurance" that is not based upon premiums or any actuarial calculation of payments and losses. As such, it has been substantially more costly to the taxpayer than federally subsidized crop insurance programs and has provided coverage to those in high-risk areas who would otherwise not be insurable. Disaster payments also provide coverage to many farmers who are already eligible for Federal Crop Insurance (FCI) and other Government disaster relief available through programs administered by the Agricultural Stabilization and Conservation Service (ASCS), the Farmers Home Administration (FmHA), the Federal Disaster Assistance Administration (FDAA), and other agencies. Farmers favor the DPP because it offers disaster protection without a premium cost and extends protection to high-risk areas where FCI is unavailable. The increased specialization of farms and higher costs of production means economic protection against natural hazards is increasingly important.

Problems Inherent in the Disaster Payments Program

The Disaster Payments Program provisions of the 1973 Act were adopted with little consideration of how the specific provisions would work and with little knowledge of likely costs to the Government. The DPP has proven to be costly, and several problems in its provisions have become apparent from experience gained during the first 2 years of operation. Five specific problems with the current DPP are particularly troublesome (18).

First, the DPP payment rate of one-third of the target price is much less than the value of the crop and often below the actual cost of production. In addition, a single payment rate is applicable to a producer whether he is prevented from planting or has suffered a loss the day before harvest. Farmers incur additional costs over the growing season with successive applications of inputs. FCIC pegs coverage for some crops to the timing of the loss, and there appears to be a similar rationale for a graduated payment rate for disaster payments.

A second problem is that production on nonallotment acreage makes otherwise eligible producers ineligible for disaster payments. Geographic production patterns have shifted significantly in the last 3 years. ASCS allotments and bases are still based primarily on historical acreages from 15 to 25 years ago. Although farm allotments and bases have not been used for production control since 1973, they are still preserved by ASCS as a basis for the disaster payments. Benefits are based upon the shortfall between the actual production and the farm's base production (allotment times the ASCS established yield), making producers without allotments ineligible for benefits; those who overplant their allotments are eligible only in the case of

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3/ In this statement, the "established price" refers to the target price stated in the legislation and the "foregoing rate" refers to the difference between the target price and the market price.

extreme loss which puts production below the allotment base. Thus, many farmers are, in effect, not covered by the DPP.

Another problem is that determination of eligibility for benefits is based upon two-thirds of the projected yield, but once a farmer is eligible, payments are based upon 100 percent of the established yield. Therefore, a farmer who produces one unit of production greater than his disaster yield is ineligible. If one unit less had been produced, he would be eligible for a substantial payment, which would be based on the difference between his actual yield and his established yield.

DPP coverage of "moral hazards" is difficult to administer and subject to abuse. Moral hazards are present in two coverages provided by the current Disaster Payments Program: (a) "...conditions beyond the producer's control" and (b) coverage for "prevented planting." For example, many payments for "...conditions beyond the producer's control" go to producers who are adversely affected by drifting chemicals sprayed from airplanes onto nearby fields, even though crop sprayers generally have insurance to cover such claims (18, p. 13). In arid regions, the availability of prevented planting payments could influence producers to not plant crops and receive payments rather than plant crops under marginal conditions. This practice leads to a considerable amount of "adverse selectivity" in the program operation.

A fifth problem is that cotton farmers receive a prevented planting payment even when a substitute crop is planted. The rationale for the exceptional treatment of cotton in the 1973 Act is unclear. If the net returns from cotton are substantially higher than those of a substitute crop, there is some rationale for basing the prevented planting payment on the differential, but this rationale would also be legitimate for other crops covered by disaster payments. A high proportion of prevented planting payments ($19.5 million of the average $28.2 million during the 1974-75 period) go to cotton farmers.

Coverage, Payments to Farmers, and 1974-75 Costs

The costs of the DPP have recently been of special concern. A record of the payments received by farmers through the DPP, FCIC, and private programs are shown in table 1 according to the four risk categories described previously. These data represent only the crop losses for 1974-75. Information from a number of years would be needed to fully assess the payments and costs under these programs.

Several conclusions may be drawn from data in table 1. First, little overlap exists between the private insurance industry and the FCIC program. Private industry generally provides hail insurance coverage to farmers based on the gross value of the crop. FCI also covers hail losses, but as it is primarily an all-risk insurance, its hail coverage is less than that offered through private hail policies. 4/ The farmer with FCIC insurance often purchases additional hail insurance when crop prospects are good. The private insurance industry generally does not cover other crop risks because they are less insurable--the $6 million in payments shown in table 1 represent the costs of an experimental program to cover other crop risks that has since been terminated.

4/ The FCIC provides all-risk crop insurance which, by law, should not exceed the cost of production with a producer able to choose a level of coverage through optional "prices" per unit. Indemnities paid by FCIC will supposedly equal 90 percent of premiums with the surplus used as a reserve and administrative costs paid by the Government.

Table 1--Average crop losses covered by insurance and disaster payments, 1974-75

Type of hazard	Private insurance industry	FCIC	DPP	Total
	Million dollars			
Crop hail	182.3	7.3	1/26.9	216.5
All natural crop losses in low-risk areas	2/6.0	55.6	3/279.2	340.8
All natural crop losses in high-risk areas	NA	NA	85.8	85.8
Hazards that prevent planting	NA	NA	28.2	28.2
Total	188.3	62.9	420.1	671.3

1/ Estimated on the basis of 1974 experience.
2/ An experimental program covering 1974 and 1975 only.
3/ Includes all low-yield payments in counties where FCIC coverage is available. A portion of this total is made to areas and producers classified as ineligible by FCIC, and therefore should be considered in the high-risk category. However, it is not possible to estimate this portion.

Source: (1, 2, 3, 7) and unpublished county data from FCIC and ASCS.

Disaster program payments are made for all four types of hazards shown in table 1. These figures indicate some overlap in coverage between hail insurance and disaster payments, but the effect of the disaster program on private hail insurance sales is unknown. For the 2-year period, an average of $26.9 million was paid for hail losses and $279.2 million was paid to cover other crop losses in counties where FCIC coverage was available. However, part of this payment was provided to farmers in areas within FCIC counties that were ineligible for FCIC coverage because of their high risk (see footnote 3 to table 1). Therefore, somewhat less than $279 million goes to producers who would otherwise be insurable, and more than $85.8 million goes to producers who cannot be covered by an economically sound insurance program.

Payments for prevented planting under the DPP averaged $28.2 million annually. This payment involves a considerable amount of moral hazard. When a field in the Texas High Plains has marginal moisture, the producer's decision as to whether or not to plant involves a considerable amount of moral hazard; it is basically a noninsurable situation. However, a field that is covered by flood water so that a crop cannot be planted represents a natural hazard that is indentifiable. The hazard is not under the control of the producer, and thus could technically be insured.

Therefore, a portion of the prevented planting coverage is insurable; the rest is a moral hazard that cannot be included in a sound insurance program. 5/

Table 2 shows the average liability coverage, premiums and losses paid, and the Government cost of the three program categories for 1974 and 1975. In table 2, as well as in the remainder of this report, only wheat, corn, grain sorghum, barley, and upland cotton are represented. Consideration is limited to these five crops because (1) they are the five crops originally covered by the DPP under the 1973 Act (although the program was later extended to rice with passage of the Rice Production Act of 1975) and (2) the data needed to estimate the likely cost of many of the policy options evaluated in this report are unavailable for other crops.

Table 2 shows that the FCI program is small in comparison to the other two programs, covering only about 7 percent of the total liability. In terms of losses paid, the DPP accounts for about three-fourths of the total of $575 million. The average 1974-75 Government cost of the current programs for these five crops is $430 million per year (includes $10 million for FCIC administrative or operating costs and payment of $420 million under the DPP).

Table 2--Average crop insurance and disaster payment coverage, payments to farmers, and cost to Government for wheat, corn, grain sorghum, barley, and upland cotton, 1974-75

Item	Private insurance industry	FCIC	DPP	Total
		Million dollars		
Liability covered	5,220	711	4,771	10,702
Premiums	182	39	--	221
Losses paid	111	44	420	575
Government cost	--	10	420	430

5/ There are additional types of hazards and other programs providing protection to farmers other than those discussed here. Hazards affecting livestock are significant. The private insurance industry provides some coverage for such losses. Other Federal programs, as previously mentioned, provide low-cost reconstruction loans, emergency feed supplies, and other types of aid to agricultural producers in designated areas. This report does not treat these programs because they appear to complement the crop insurance programs under consideration. Additionally, hazards affecting buildings, other property, and people were considered beyond the scope of this report.

Federal Crop Insurance Issues

The DPP is, in a sense, in competition with the FCIC. Farmers eligible for the DPP may be less inclined to purchase FCI than if the DPP were not available. However, not all producers are able to purchase FCI since the enabling legislation requires FCIC to operate on an actuarial basis with authority to refuse to sell insurance if the risks are excessive. As a result, FCI is not available for the 20 to 25 percent of the acreage where the risks of crop failure are high. Even where available, FCI has a low level of participation; only about 17 percent of the eligible acreage of wheat, corn, barley, grain sorghum, and cotton was insured in 1976. Some policymakers have suggested that it is unacceptable to rely upon a program for providing risk protection to farmers that has such a low level of participation.

Existing law limits direct appropriations for FCIC administrative and operating expenses to $12 million annually. However, FCIC is allowed to use premium income to pay operating expenses above $12 million each year. Over the years, FCIC has used about $74 million in premium income for such expenses (18). Since this practice decreases the reserves FCIC maintains against unforeseen losses, its continuation tends to place the program in an impaired capital position. An increase in the administrative expense appropriations to $20 million or more each year appears necessary to maintain a sound program. The appropriation would need to be much higher if FCIC were to expand coverage or to substantially increase participation among eligible farmers.

Federal Programs and Private Industry

The private insurance industry has misgivings about both the FCI and the DPP because such programs may hurt their present or potential sales. Private industry has long been interested in providing multiple-peril coverage of crops and has attempted to do so in the past. However, these efforts have been unsuccessful because of the unavailability of reinsurance to spread the risks over time, the lack of data on which to base rates, and competition with the FCIC (which receives a Treasury appropriation to cover administrative and operating expenses).

A partial solution to these problems is a reinsurance program whereby FCIC provides reinsurance on a sound actuarial basis to the private sector. This would enable overcoming one private industry barrier to providing multiple-peril crop insurance by permitting them to spread their risks over time. However, FCIC premiums are based on a 90 percent loss rate. Since private industry must charge premiums high enough to cover operating costs, as well as interest on capital, losses must average only about 60 percent of the premium. As a result, private insurance rates would have to be as much as 50 percent higher than FCIC rates to be profitable, even with reinsurance. Farmer participation would be reduced with these higher rates.

POLICY OPTIONS

A number of options are available to policymakers for assuring that the agricultural industry has protection against crop losses resulting from natural disasters. These options are not mutually exclusive, and a policy chosen may involve some combination of the individual options. A first option is simply continuation of current programs--continuing the DPP without modification of current provisions in the 1973 Act. While this extension would do nothing toward alleviating any current problems with the program, it would continue protection to many farmers in high-risk areas who cannot obtain FCIC or private industry coverage. Extension of the current situation would also provide a convenient benchmark to evaluate other program options.

A second option is Federal Government subsidization of the private insurance industry. A major goal of this option would be to decrease the direct Federal role in crop insurance and to encourage private industry to enter. At the minimum, this option would include a FCIC reinsurance program for private industry so that their losses could be balanced over many years. At the maximum, the Government could subsidize private industry to cover operating expenses and return on investment so that the private industry's rates for multiple-peril crop insurance could be comparable to those of the FCIC. Under this option, the DPP could be terminated and the FCIC activities might not be expanded, except for the reinsurance program.

A third option is a premium subsidy for national crop insurance. Three types of changes would have to be made in the current FCIC program: (1) reorganize FCIC to allow expanded activities, (2) increase the Government support of FCIC administrative costs so that premium income would not be required to cover operating expenses and to enable expanding the sales efforts, and (3) change the legislation so that premiums could be subsidized. Under this option, FCI would be made available nationwide for the entire acreage of the program crops (wheat, corn, grain sorghum, barley, and upland cotton), and the DPP would be terminated. The premium structure, including the portion paid by Government, would be set on a 90-percent loss ratio basis, as with the current FCI program. The appropriation to cover administrative expenses would need to be increased substantially to allow for expanded sales activity and for servicing the higher volume of business.

Modification of the Disaster Payments Program is a fourth option. Since the program basically represents free insurance, a number of modifications could be made in the DPP as currently formulated to (a) improve the equity among producers so that payments more nearly equal losses, (b) avoid excessive payments in certain instances, and (c) accomplish program objectives at a reduced cost to the Government. Most of these changes would require modification of the authorizing legislation.

The overlap between the DPP and the FCIC could be limited in several ways. Some of these might involve various mandatory programs. For example, FCIC insurance could be made a requirement for eligibility for the DPP, with payments adjusted to cover only the difference between a producer's loss and his FCIC indemnity. Under the option selected for evaluation in this report, a modified Disaster Payments Program would be offered only in high-risk areas not currently covered by FCI. In areas currently covered by the FCIC, a subsidized FCI program would be made available.

Each of these policy options has a unique set of implications for farmers and taxpayers. The following sections examine these implications and the costs and benefits of the different alternatives.

EXTENSION OF THE CURRENT PROGRAMS

The current programs have important implications from the standpoint of both the individual farm and the Nation. A description of the mechanics of the current programs and a detailed analysis of the impacts on farms, total benefits, and costs show the situation that would result if the current legislation is extended without modification. The analysis also provides a benchmark for comparison of other policy options evaluated in this report.

Impacts of the Current Programs on Farms

Disaster Payments Program

Under the current DPP, the disaster yield used to determine eligibility is calculated as two-thirds of the established yield times an adjustment factor to reflect disparity between established and historical yields. In practice, the disaster yield approximates two-thirds of a farmer's historical yield, where the historical yield is defined as the 10-year moving average harvested yield. Farmers who qualify for disaster payments are paid the difference between their actual yield per planted acre and their ASCS established yield at the rate of one-third of the target price for that crop.

To evaluate the effect of DPP on the return of farms with low yields, consider a typical wheat farm. Assume that the cost per acre on this farm is equal to the 1976 U.S. average cost reported by the Economic Research Service (ERS) (6), and that the preharvest costs are 80 percent of the operating expenses ($30.44 per acre for wheat as shown in table 3). (Note that operating expenses as used here include variable preharvest and harvest expenses but does not include machinery ownership, overhead, or land expenses.)

Table 3--Average U.S. production costs by program crops, 1976

Item	Cost per acre				
	Corn	Grain Sorghum	Barley	Wheat	Cotton
	Dollars				
Preharvest cost[1/]	79.63	41.90	31.14	30.44	128.81
Harvest cost	19.91	10.48	7.79	7.61	32.20
Total operating expenses .	99.54	52.38	38.93	38.05	161.01
Machinery ownership.	25.59	23.43	17.90	14.70	46.60
Overhead	9.12	5.99	5.76	5.69	10.00
Total[2/]	134.25	81.80	62.59	58.44	217.61

1/ Tentatively estimated as 80 percent of operating expenses.
2/ Excluding land and management.

Source: (6)

Figure 1 illustrates costs and returns for this farm under varying yields. The main cost components are illustrated as horizontal lines. The average costs and returns for an acre of wheat as shown in figure 1 are not affected by yields. 6/ As shown in figure 1, about 16.6 bushels are required to cover preharvest and harvest costs; 25.5 bushels are required to cover all costs except land. The diagonal line represents the gross returns a farmer would receive from sale of wheat at all yields between zero and 30 bushels per acre.

With the DPP, gross returns at yields less than 20 bushels per acre are shown by dashed line abc. The current disaster yield is 19.9 bushels per acre, two-thirds of the national 10-year moving average harvested acre yield. For yields above 19.9 bushels, the farmer receives no disaster payment and therefore obtains a return shown as the diagonal line beyond point c in figure 1. At a yield of 19.9 bushels or less per acre, the farmer qualifies for a disaster payment based on the difference between his yield and his ASCS established yield. Assuming the established yield for this typical farm is 32.6 bushels per acre, the farmer receives a payment of $0.76 on 12.7 bushels or $9.65, increasing his returns to $55.22 as shown in figure 1, point b. From this point each bushel decrease in yield increases the disaster payment $0.76 but decreases gross returns $2.29, resulting in a gross return function sloping downward to $24.78 for a complete crop failure at point a. 7/

Figure 1 illustrates two problems with the DPP. First, because of the low payment rate of one-third of the target price, farmers with yields only slightly below the disaster yield receive relatively high returns. The disaster payment to farmers with complete crop failures would not cover even preharvest costs. The second problem is the jump in returns ("snapback") a farmer obtains as he meets the minimum eligibility requirements for disaster payments. In this case, a farmer receives about $9.65 per acre as he reaches the disaster yield level. On a 500 acre wheat farm, a farmer would obtain no payment if he harvested 9,950 bushels, but he would obtain a $4,825 payment if he harvested 9,949 bushels. Basing the payment on the established yield, but determining eligibility on a lower disaster yield, can result in a very high payment for one less unit of production.

Federal Crop Insurance Program

The impact of Federal Crop Insurance on the returns of an average wheat farm is similar to that of the DPP, but with two major differences. For FCI, coverage is available for 45 to 75 percent of a farmer's average yields, but not more than the crop costs incurred (adjusted for the insurance risk in the specific area). For wheat, the national coverage in 1976 averaged about 60 percent of the average yield (17.4 bushels in terms of the wheat farm illustrated in fig. 1). Farmers had a choice of three payment rates--$1.25, $2.00, or $2.50 per bushel; the average rate for 1976 was $2.24 per bushel. The average coverage per acre was then $38.98, which would cost $2.34 in premiums at the average FCI wheat premium cost.

6/ This representation of costs may not be entirely realistic, especially for harvest costs, which would be expected to increase some as yield increases. However, no definitive information is available on the relationship between harvest costs and yields; therefore, harvest costs are shown as a constant at $7.61 per acre, regardless of the yield level.

7/ The situation shown here represents a farmer who has planted within his wheat allotment. Farmers who overplant their base or allotment are not eligible for payments unless their actual production on all acreage is less than their disaster yield times their base or allotment.

GROSS RETURNS PER ACRE UNDER DPP FOR AN AVERAGE WHEAT FARM, 1976

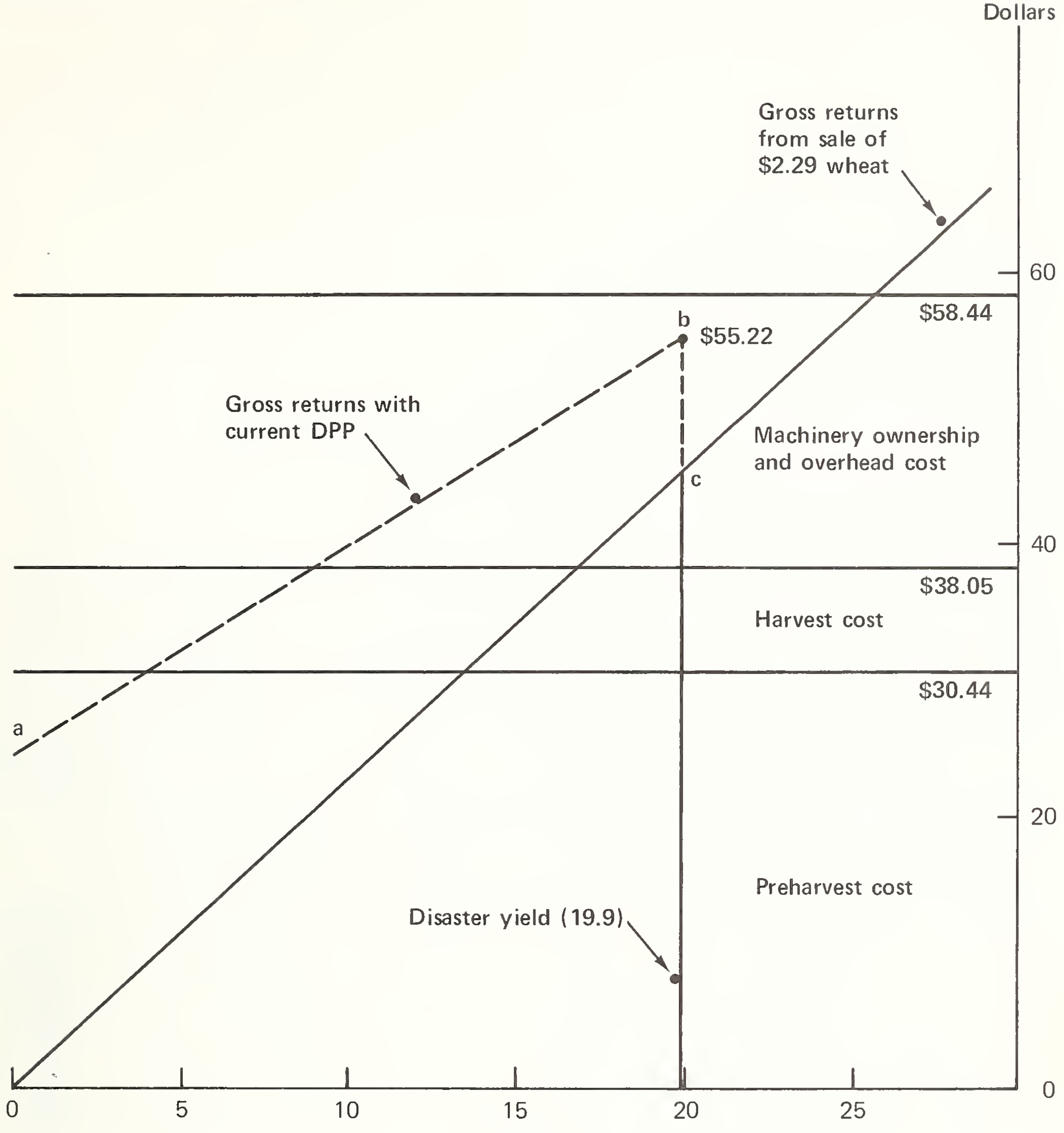

Figure 1

As a result, all costs in figure 1 would be $2.34 higher for a total preharvest and harvest cost (total operating expenses) of $40.39. At the 17.4 bushel yield, gross returns would equal $39.85 at the target price which is nearly equal to operating expenses. For yields lower than 17.4 bushels, decreasing returns from the sale of wheat would be nearly equaled by the FCI indemnity amounting to $38.98 with a complete crop failure. Thus the gross return line for an average wheat farm with FCI would fall almost along the figure 1 line showing harvest and preharvest costs, given the appropriate increase for the FCI premium. Therefore, because of its higher payment rate, FCI would cover nearly all of a farmer's operating expense, regardless of how low actual crop yields were. Also, because the amount of the payment is based on the same yield used to determine eligibility for payment, there is no jump in gross returns as yields decrease to the eligibility level.

Case Study of a High-Risk Area

It is perhaps informative to look closely at a typical production area in the high-risk category that is not covered by FCIC. Kiowa County, Colorado, suits this purpose. It is on the edge of the Dust Bowl and is a wheat-producing area with over 200,000 acres of wheat planted annually. A severe drought during the early fifties caused FCIC to abandon its program there in 1955. From 1955 through 1973, farmers had no protection against crop losses caused by drought.

Wheat yields during the 1945-75 period exhibited a statistical trend increasing from 7.5 bushels in 1945 to 14.5 bushels in 1975 (fig. 2). The standard deviation around this trend is 8.2 bushels. Net income per acre based on historical prices and costs averaged $7.21 over the same period (fig. 3). The standard deviation in net income is $20.70, and the coefficient of variation (standard deviation divided by the mean) is 288 percent. Net income was negative in 13 of the 31 years. Farmers' losses

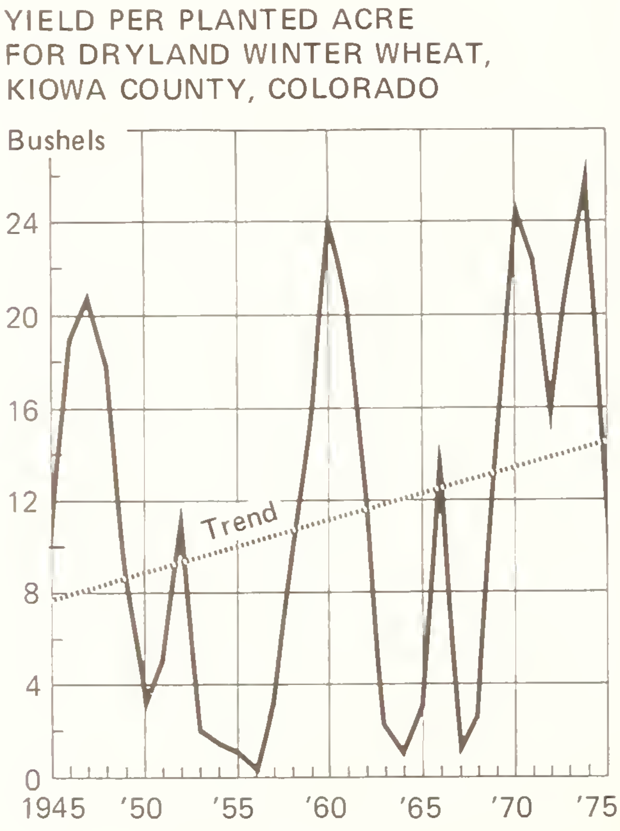
YIELD PER PLANTED ACRE FOR DRYLAND WINTER WHEAT, KIOWA COUNTY, COLORADO

Figure 2

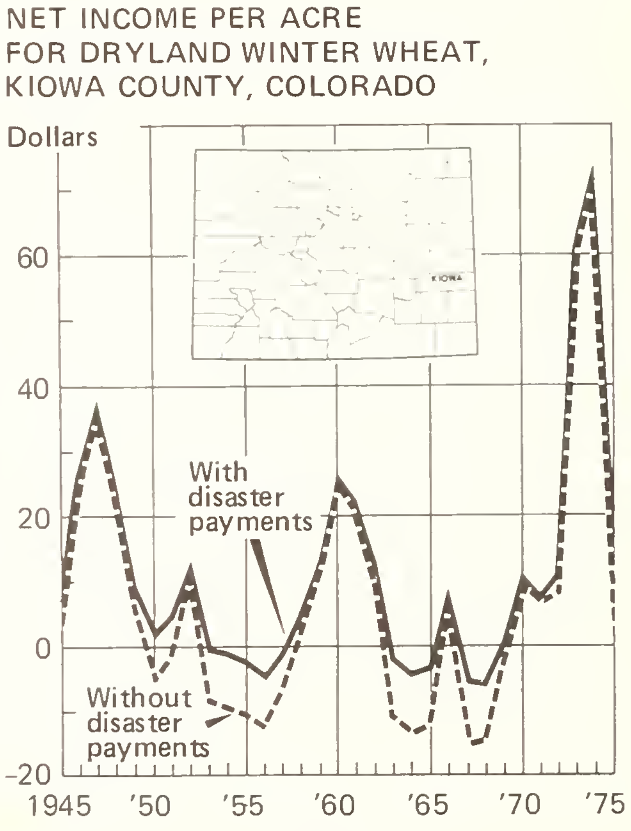
NET INCOME PER ACRE FOR DRYLAND WINTER WHEAT, KIOWA COUNTY, COLORADO

Figure 3

during years in which crops failed nearly equaled the net returns during years in which yields were good. This suggests that an economically sound insurance program would require a premium so large that farmers could not afford the protection.

Based on the way in which DPP was administered in Kiowa County in 1974 and 1975, annual disaster payments were estimated under the assumption that the program had been operative since 1945. Over the 31-year period, the average disaster payment per acre would have been $4.02. This payment would have increased the average net income from $7.21 to $11.23 per acre and lowered the coefficient of variation of income to 163 percent--a 43-percent reduction. The disaster payments would have increased net income, with most of the increase occurring in poor years, although some farmers had crop failures and received payments even when the county average yield was high.

In relation to the categories in table 1, Kiowa County represents a commercial wheat production area where risk is so high that it precludes the operation of a sound insurance program with realistic premium rates (ones that farmers would be willing to pay). If producers in such areas are to be protected against losses from drought, a highly subsidized insurance program or a DPP such as provided by the 1973 Act appears to be necessary.

Expected Costs of Current Programs

The actual disaster payments for 1974 and 1975 and the expected value or point estimates for payments in 1976 are shown in the following tabulation:

Program provision	Actual DPP payments 1974	Actual DPP payments 1975	Expected 1976 payments with average weather
	Million dollars		
Low yield . . .	521.8	262.0	300.2
Prevented planting . .	35.3	21.2	28.2
Total . . .	557.1	283.2	328.4

A histogram of the expected distribution of low-yield payments under the 1976 disaster program with trend yield assumptions is shown in figure 4. The distribution of expected crop yields in 1976 has been used to estimate the distribution of expected disaster payments. At the extremes of the distribution, a payment of less than $150 million would occur 5 years in every 100, and a payment of more than $750 million would occur only once in 100 years. The average of all payments in the histogram is, of course, the $300.2 million shown in the preceding tabulation.

These estimated payments are functions of crop yields in much the same way that actual disaster payments depend on actual crop yields. Therefore, crop yield parameters are a cornerstone for the estimating procedure. These are the parameters that describe the trend and expected value of future crop yields, the variance and standard deviation around this trend, and the correlation between the yields of different crops. 8/

Since yields can vary considerably from year to year, the impact of adopting any of the options considered will also vary from year to year in line with the actual conditions. All estimates are keyed to the base year (1976), reflecting the acreage, trend yields, and indemnity rates per unit for that year. Estimates such as those shown in the last column of the preceding tabulation may be interpreted as the average of what would occur if the base year could be repeated several hundred times. The estimates do not include any knowledge about the actual yields and crop conditions that are now observable for the base year. Projections for the future would need to reflect any expected changes in the values of the base variables. The variation around the average from year to year is partially due to weather conditions. This variation is shown in figure 4.

EXPECTED LOW-YIELD PAYMENTS UNDER THE CURRENT DPP, 1976

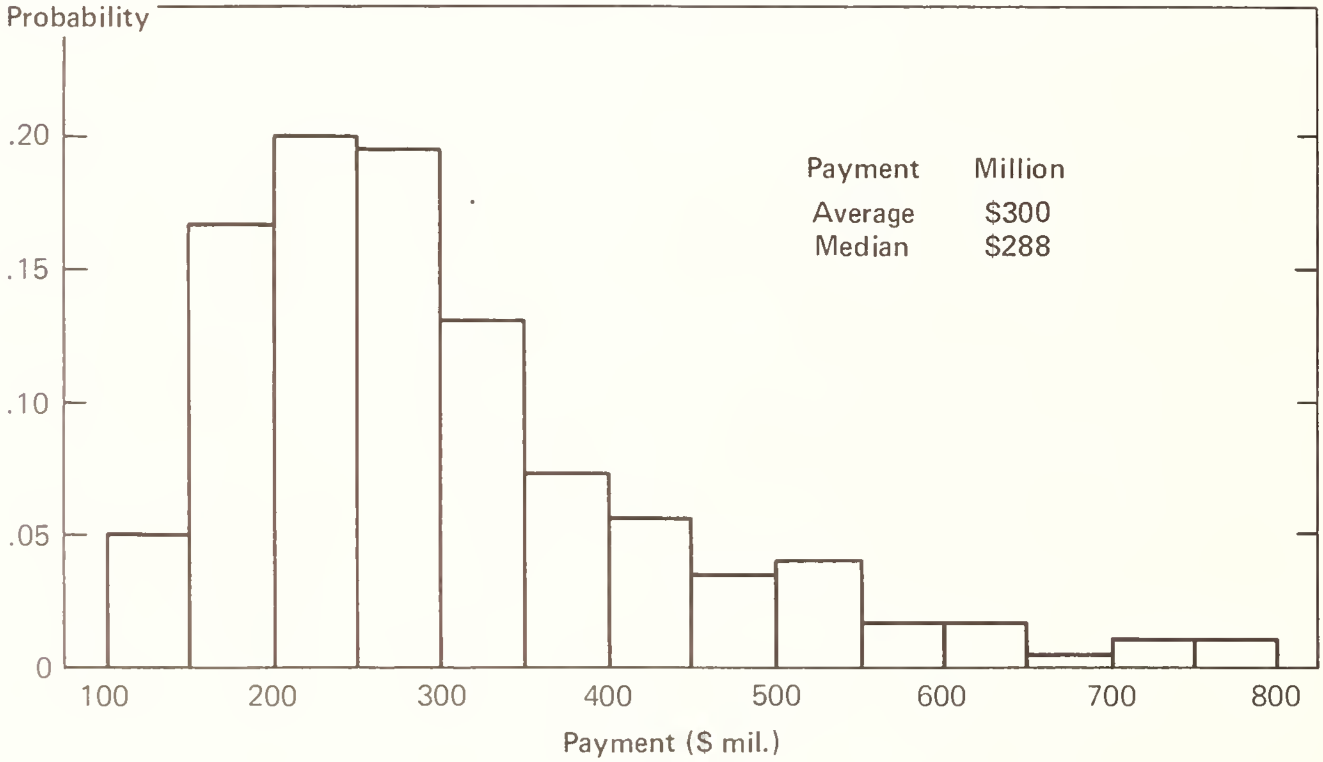

Figure 4

8/ These estimates are made using a stochastic simulation model (12). The model first generates an annual series of crop yield history for the program crops. It then computes the disaster payments for each crop in each year based on an extension of the actuarial methods used by FCIC in its early years to set premium rates. These payments are tabulated in the form of frequency distributions (as shown in figure 4) on the basis of a 1,000 year simulation. Since this is a simulation model, the relative accuracy of the estimates must be determined through a validation procedure rather than in a statistical sense. Historically, the model estimates 1974 and 1975 payments for each crop within 1 percent of the actual payment. These test runs suggest that the type of information presented in the preceding tabulation and figure 4 is likely to be within 10 percent of the true values.

Estimates of the costs, coverages, and payments from continuing the current DPP and FCI program for 1976 are shown in table 4. For comparison, the actual 1974 and 1975 data are also presented. Farmers in current FCIC areas are expected to receive $45 million in indemnities from FCI and $254 million under the disaster program. In areas not covered by FCIC in 1976, farmers are expected to receive $74 million in disaster payments. Estimated costs to the Government include $12 million for FCIC administrative and operating costs and $328 million for disaster payments for a total of $340 million, (not including the DPP administrative expenses). 9/ The total FCI indemnities and disaster payments to farmers are expected to be $373 million, with a total liability covered by both programs of $6,394 million.

Table 4--Costs and coverage of current FCI and DPP for corn, grain sorghum, barley, wheat, and upland cotton, actual 1974 and 1975 and expected 1976

Area and coverage	1974	1975	Expected 1976 1/
	Million dollars		
CURRENT FCIC AREAS: 2/			
Premiums	31.8	45.9	49
Liability	584.1	836.8	913
Indemnities	49.8	38.6	45
DPP:			
Liability	4390.0	4427.1	5069
Payments	423.3	219.3	254
OTHER HIGH-RISK AREAS			
DPP:			
Liability	360.8	364.4	412
Payments	133.8	63.9	74
TOTAL ALL AREAS			
DPP:			
Liability	4750.8	4791.5	5481
Payments	557.1	283.2	328
FCIC:			
Sales activity	1.4	1.4	1
Other operating cost	8.4	9.7	11
Total Government cost	566.9	294.3	340
Both programs:			
Liability covered	5334.9	5628.3	6394
Disaster payments and indemnity	606.9	321.8	373

1/ Under average weather and historical trend yields.
2/ FCIC participation rate for 1975 is 16.4 percent; the expected rate is 17 percent for 1976.

9/ The DPP administrative expenses are not included in any of the Government cost figures shown in this report since it is impossible to separate such expenses from the total ASCS budget.

NATIONAL CROP INSURANCE WITH A PREMIUM SUBSIDY

Several modifications in the insurance offered by FCIC and changes in the way its activities are funded would be required if the program were to be successfully expanded nationwide for the program crops. The appropriation for administrative expenses as provided by law would need to be substantially increased to cover costs of an expanded program. In order to eliminate overlap between programs, the DPP would be terminated under this option.

Since one of the objectives of this option is to substantially increase farmer particpation in FCI, it is necessary to evaluate the alternative means of expanding the business. Two approaches that may be used either jointly or separately are an increase in sales effort and the introduction of a premium subsidy. Since the funds used to promote FCI and to solicit business are appropriated, an increase in sales effort would require increased funding by Congress. A premium subsidy would also require Congressional action since the Federal Crop Insurance Act does not authorize such a program.

Increased Sales Activity to Expand Participation

Little insurance is sold if companies wait for potential buyers to come and ask for it; Federal Crop Insurance is no exception. It must be aggressively sold. The low level of FCI participation (17 percent of eligible acreage for the program crops in 1976) is at least partly due to the minimal selling effort over the recent history of the program. Increasing the appropriation to allow an expanded sales program is one way to expand FCI sales, but there are limits on the effectiveness of this approach.

The relationship between sales activity and participation is not clearly discernible, but some information is available. Since about 90 percent of FCI customers in any year also purchase the following year and since the effort required to keep existing customers is lower than to sign-up new policyholders, a given level of participation could be maintained in subsequent years at a much lower sales effort than that required to reach a target level during the first year.

Increased expenditures for sales activity are required per dollar of premium as the level of participation expands. At some point, it becomes ineffective to expand coverage by sales activity alone, since the sales costs would consume a high proportion of any additional premiums collected. However, the increase in premiums collected may be quite significant for the first $5 to $10 million devoted to sales activity on the program crops.

Impact of a Premium Subsidy on Participation

Since it becomes increasingly difficult to obtain higher levels of participation through sales activity alone, a premium subsidy, paid by the Government, may also be required to achieve a satisfactory participation rate. A subsidy, in effect, lowers the price producers must pay for insurance--the higher the subsidy the lower the price of coverage to producers. For a given level of sales activity, increasing the subsidy would be expected to expand participation. Conversely, for a constant subsidy, increasing the sales activities would also increase participation. With knowledge of these relationships, a "demand curve" for insurance may be drawn indicating the relationship between premium income and the subsidy level. An increase in sales activity would have the effect of shifting the demand curve to the right.

Demand curves reflecting the best information currently available on FCI are shown in figure 5. These curves reflect the judgment that expenditures on sales effort of up to $6 million would be somewhat more effective than the same expenditure through a premium subsidy, but that beyond this level, a dollar spent on sales or premium subsidy would be equally effective. 10/ The demand curves shown in the figure were used in estimating participation rates and Government costs for the crop insurance options evaluated in this report.

PRODUCER DEMAND FOR CROP INSURANCE FOR THE FIVE PROGRAM CROPS IN CURRENT FCIC AREAS UNDER ALTERNATIVE LEVELS OF PREMIUM SUBSIDY AND SALES ACTIVITY

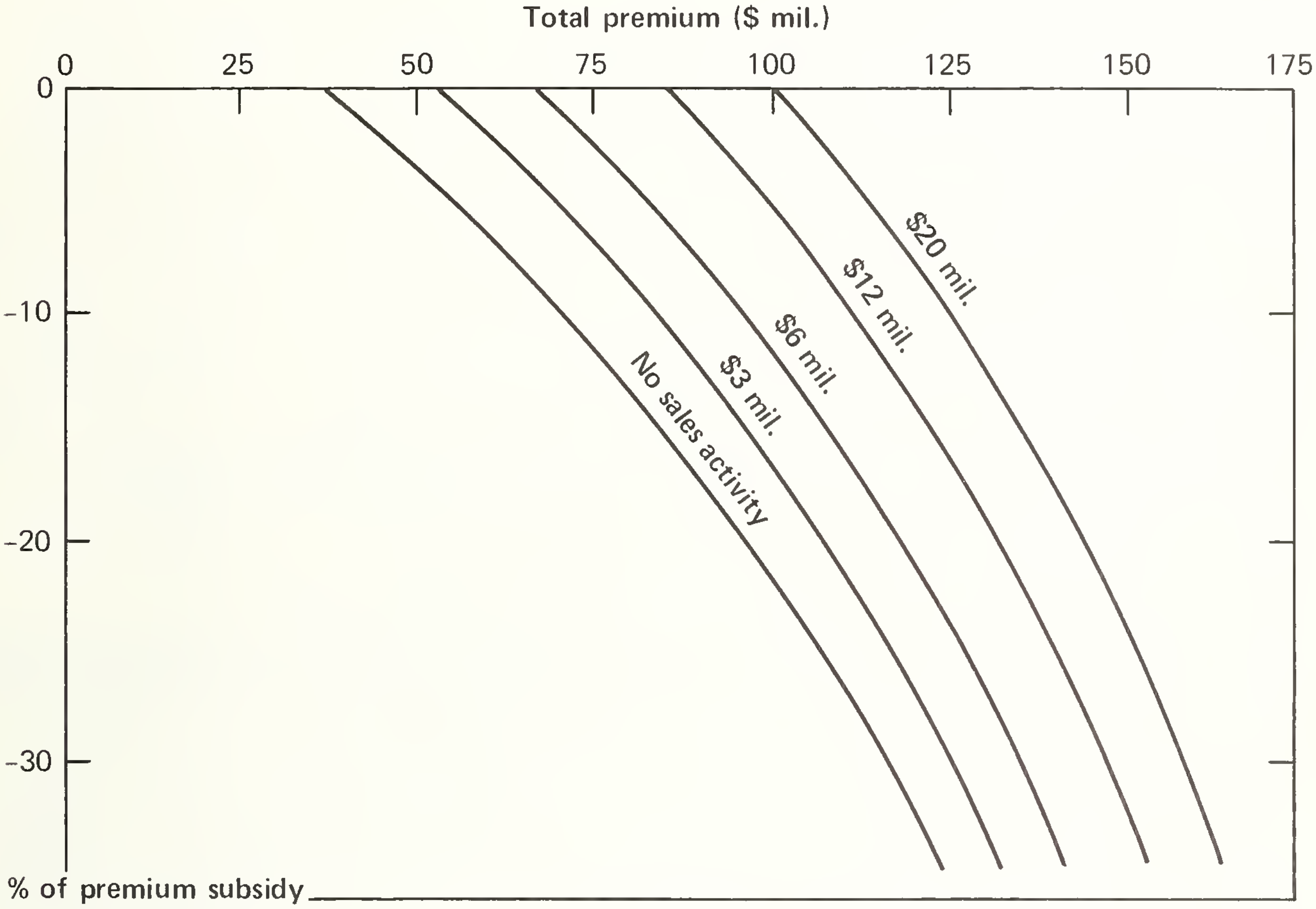

Figure 5

10/ The relationship between percent of premium subsidy and total premium represented in figure 5 is based on the judgment of the authors after consultation with FCIC officials. The relationships have not been estimated statistically and caution should be exercised in their interpretation.

Estimated Coverage and Costs

In order to estimate the expected results from adopting a program of national crop insurance, several decisions were required concerning the specific nature of the program. As stated earlier, FCIC would offer coverage to all producers of wheat, corn, barley, grain sorghum, and upland cotton. The coverage offered by FCIC would be at least 60 percent of the average yield as opposed to the 45 to 75 percent currently offered. FCIC would retain the authority to offer additional coverage if it were sound to do so. 11/ The premium structure, including any Government paid part, would be set on a 90-percent loss ratio, the same as the current FCIC program, with the remaining 10 percent used to build a capital reserve.

Besides setting coverage in terms of yields, a decision would have to be made in pegging the indemnity rate per unit of production. The present FCIC program allows farmers to select (from three price options) the amount that they will be indemnified for each unit that production falls below the guarantee. Under the new program, with the introduction of a premium subsidy, FCIC should probably be provided with legal guidelines for setting the base price option, perhaps based upon national average direct production costs or upon the target prices. This would allow basing the amount of premium subsidy per acre upon a base price selection and then applying that per acre subsidy to other levels of coverage. This would provide flexibility to farmers in choosing their indemnity rate per unit, but the premium subsidy per acre would be determined by the base level of coverage. For evaluating this option, it was assumed that the payment rates per unit of production below the guaranteed yield equaled the average FCI indemnity levels selected by producers in 1976. These levels include corn and grain sorghum at $1.58 per bushel, barley at $1.44 per bushel, wheat at $2.24 per bushel, and cotton at $0.38 per pound.

Two different types of premium subsidies are considered in this analysis: (1) A flat 25-percent subsidy of the premiums for the program crops, and (2) a subsidy of 25 percent of premium cost up to 8 percent of liability with a subsidy of 40 percent for the remainder. Judgment was used to select the level of expenditures on sales activities by criterion that cost effectiveness should be maintained for the last dollar spent on sales. For the flat 25-percent premium subsidy, an expenditure of $16 million was chosen (table 5).

Estimates of coverage, participation, indemnities, and Government costs are shown in table 5. Most of these estimates are dependent upon the estimates of participation rates. Both of the subsidy levels shown in table 5 result in substantially higher FCI participation in areas where FCIC currently operates than the actual 17 percent in 1976 (see table 4). The premium subsidies and increased sales activities would be expected to expand participation to 40 or 43 percent in the current FCI areas. 12/ Participation is expected at 40 percent with a flat 25-percent subsidy and at 59 percent under a variable subsidy in the higher risk areas. The larger participation in high-risk counties under a variable subsidy is due to the greater premium subsidy. On a national basis, participation would be between 40 and 47 percent, depending upon the subsidy level.

11/ Currently the average coverage offered by FCIC for program crops is between 60 and 67 percent of the average yield. The coverage offered to individual producers ranges from about 45 to 75 percent of their average yields, with the lowest coverage applicable to the highest risk areas. Under a new program, it is suggested that FCIC could go above the minimum 60 percent, but FCIC would not necessarily subsidize the premium on any coverage above the base. This flexibility would allow FCIC to better meet the needs of producers than by prohibiting coverage above the base and would retain equity among producers by offering the same subsidy per acre for a producer regardless of the coverage purchased.

12/ The participation levels indicated are the expected rates in the first 1 to 2 years of the outlined programs.

Table 5--Subsidized national Federal Crop Insurance costs and coverage for wheat, corn, grain sorghum, barley, and upland cotton, 1976 estimates[1]

Area and coverage	25 percent premium subsidy	Variable[2] 25 to 40 percent subsidy
	Million dollars	
CURRENT FCIC AREAS:[3]		
Premium subsidy	35	44
Producer premiums	105	106
Total premiums	140	150
Liability	2,497	2,682
Indemnities	126	135
OTHER HIGH-RISK AREAS:[4]		
Premium subsidy	10	22
Producer premiums	30	38
Total premiums	40	60
Liability	203	298
Indemnities	37	54
TOTAL ALL AREAS:[5]		
Premium subsidy	45	66
Producer premiums	135	144
Total premiums	180	210
Liability	2,700	2,980
Indemnities	163	189
FCIC:		
Sales activity	16	20
Other operating cost	36	40
Premium subsidy	45	66
Total cost	97	126

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[1] Coverage and costs estimated for average weather and crop conditions, all planted acreage eligible for 60 percent coverage, and 1976 price options.

[2] Subsidy of 25 percent of premium cost up to 8 percent of liability with a 40-percent subsidy above 8 percent.

[3] FCIC participation rate for flat 25-percent subsidy is 40 percent; 43 percent for variable 25-to 40-percent subsidy.

[4] FCIC participation rate for flat 25-percent subsidy is 40 percent; 59 percent for variable 25-to 40-percent subsidy.

[5] FCIC participation rate for flat 25-percent subsidy is 40 percent; 47 percent for variable 25-to 40-percent subsidy.

Expected indemnity payments to farmers of $163 to $189 million are substantially lower than payments under continuation of present programs, even though the payments made by FCIC would increase by 3 to 4 times. This overall reduction is because of the elimination of payments under the DPP, which covers all producers with allotments. Total liability covered, which ranges also from $2.7 to $3.0 billion, drops substantially because of the elimination of the DPP.

The expected average Government cost is $97 to $126 million, depending upon the premium subsidy. The estimated costs of the premium subsidies alone would be between $45 and $66 million, depending upon the type of subsidy offered (table 5).

Compared with continuation of present programs, the option of a nationwide insurance program would achieve increased participation and reduces Government costs. However, total coverage and expected indemnities would also decrease substantially because a large percentage of farmers would probably not purchase FCI even with the elimination of the DPP.

AID TO THE PRIVATE INSURANCE INDUSTRY

Under this policy option, the direct Federal role in crop insurance would be decreased and the private insurance industry would be encouraged to offer multiple-peril crop insurance. If such a program were successful, the DPP might be terminated and there would be less need for expanding FCIC operations. Two types of Government activities are often mentioned: (1) Development of an FCIC reinsurance program available to private industry to enable them to spread their loss experience over several years, and (2) a Government subsidy for operating expenses or premiums so that private industry could offer multiple-peril crop insurance at rates comparable with FCIC.

A Federal Crop Insurance Corporation Reinsurance Program

Several forms of reinsurance are used by the insurance industry to allow an insuror to share assumed risks with one or more similar agencies specializing in reinsurance. There are a number of benefits from such reinsurance. One major benefit is that it provides the insuring agency a means of spreading risk and loss experience over large geographical areas and over time. This is particularly important for natural hazards since there is a probability of a very large loss in a single or limited number of years over large geographic areas. Of course, reinsurance also provides a guarantee that losses can be met without dangerously depleting the reserves of the insuror. This protection means that policyholders can have more stable (and possibly reduced) insurance rates from year to year.

Although such reinsurance would be helpful to private companies offering multiple-peril crop insurance, it is not available from private reinsurers because of the probability of large and widespread losses during periods of drought, which make the risk higher than even they can safely assume.

Section 508(a) of the Federal Crop Insurance Act authorizes FCIC to offer reinsurance to private insurance companies. However, the authorization requires that reinsurance for private insurance companies shall be limited to no more than 20 counties. This provision has never been implemented because of the small amount of multiple-peril crop insurance offered by the private sector, and because the 20-county limitation precludes establishment of a sufficient base for dispersion of risk upon which a sound reinsurance program could be constructed.

Although other changes in the Federal Crop Insurance Act may be required, removal of the 20-county limitation on reinsurance programs would allow FCIC to offer reinsurance to the private sector on an actuarially sound basis and at a reasonable premium cost. No additional budget authority and only small Federal outlays would likely be required. The availability of a reinsurance program would provide needed impetus for the private sector to expand their role in offering crop insurance.

Subsidies for Private Industry

Even with a reinsurance program, it is unlikely that the private industry could offer multiple-peril crop insurance to farmers at premium rates comparable to current FCIC rates. Current FCIC rates are attractive because operating and administrative costs are funded by a direct appropriation, and because FCIC is not required to pay interest on its capital stock as is the private industry. Therefore, FCIC can base premiums on a 90-percent loss rate, while private industry must base premiums on about a 60-percent loss rate to enable covering operating costs, reserves, and returns on investment. As a result, FCIC premium rates represent what some view as unfair competition to private industry.

To remedy this situation, FCIC would have to either (1) raise its rates to a level comparable to those required in private industry, (2) stop selling at the retail level and concentrate solely on reinsurance, or (3) finance a comparable subsidy for private companies to make their insurance price competitive.

The first option would require FCIC to raise rates by 40 to 50 percent. With the difficulty in getting participation by FCIC, even at current rates, it is questionable whether insurance at the higher rates would result in participation rates acceptable to policymakers to allow termination of the DPP. This conclusion would also apply to the second option where only the private companies would sell at the retail level.

The third option, subsidy of multiple-peril insurance offered by the private insurance industry and reinsured by FCIC, would therefore appear the only viable option of significantly expanding the amount of crop insurance purchased by farmers.

The amount or specific nature of this subsidy has not been determined, although some clue of its size is offered by comparison of the targeted loss ratios of FCIC and private industry. Whatever the amount of the subsidy, the limitation of this approach is that it is unlikely that the private insurance industry could take the responsibility for offering multiple-peril crop insurance to all producers of a specific crop. Rather, sound insurance management dictates that multiple-peril crop insurance would be limited to the major producing regions and to low-risk producers. It is extremely unlikely that the private insurance industry, even with subsidies and reinsurance, could make a significant contribution to insuring high-risk areas and producers currently ineligible for FCIC insurance.

A superficial analysis suggests that, even in the low-risk areas, it may be less costly for the Government to provide coverage through FCIC than through a program of reinsurance and subsidy to private industry. However, any extension or expansion of FCIC or improvement in DPP may seriously erode sales of crop-hail insurance by the private industry.

POSSIBLE IMPROVEMENTS IN THE DISASTER PAYMENTS PROGRAM

Based on experience gained during the first 2 years of operation, Congress could consider effecting improvements in the current DPP. Five alterations in the structure and operation of the DPP would provide what might be more equitable coverage of farmers' income losses. These are alterations based on preserving the universally free insurance concept, but changing the coverage and method of determining program payments. Although it would be possible to include any number of these alterations in new legislation, they are evaluated as a total package of improvements for the DPP.

Alterations for the Disaster Payments Program

Eliminate Prevented Planting Coverage

As discussed earlier, one problem with the current DPP is the abuses that have occurred and that would likely continue under the prevented planting option. Many of the hazards under this provision are of a moral nature, such that the availability of the coverage influences the producer to make a management decision that enables receipt of a payment rather than to attempt to minimize the loss. In addition, if the goal of disaster protection is to protect a farmer's investment in a crop, there is little rationale for a prevented planting payment in a situation where a farmer has incurred little, if any, production costs; such is the case where spring flooding prevents field work. Finally, the difficulty in determining the loss when the planting of a primary crop is prevented but a substitute crop is planted makes it difficult to compute an appropriate indemnity. Under the current DPP, cotton farmers can receive a prevented planting payment even if a second nonconserving crop is planted, but feed grain and wheat farmers lose their eligibility for a disaster payment or have their payment substantially reduced if they plant a substitute nonconserving crop.

A solution to problems with the prevented planting coverage is extremely complex. Experience with the DPP program in 1974 and 1975 suggests that losses to producers are small, particularly when substitute crops may often be planted. Yet, payments for prevented planting were $35 million and $21 million in 1974 and 1975, respectively. These considerations suggest that a logical economic decision is to eliminate the prevented planting provision from the DPP rather than attempt to rectify all of the difficulties.

Lower the Yield Guarantee

A second important alteration for the DPP involves eliminating the large increase in returns as farmers qualify for the disaster payment (the so-called "snapback"). This can be accomplished by structuring the program in the same way that FCIC payments are computed--by making the payment or guaranteed yield equal to the disaster yield. This removes the discontinuity or jump in net returns (in fig. 1) since the payment is made only on the difference between a farmer's actual yield and his disaster yield. Under this lower guarantee, gross returns would decrease with this change in the DPP (from point c to point a in figure 1) as the farmer's yield decreases.

This is an important change in the DPP since it eliminates the unwarranted importance of the marginal unit of production in determining the payment (18, p. 6). Under the existing program, farmers, aware of their disaster production level, may be induced to modify harvesting during periods of natural disaster or drought to obtain a payment. This modification of the existing program places an increasing burden on program administration and costs in the future.

Increase the Payment Rate

Under the current DPP, benefits for a farmer with a complete crop failure are very low compared to those of farmers with yields closer to but still below their disaster yields. For each unit that a farmer's yield is decreased below the disaster yield, he loses the value of a full unit of production but obtains only a payment of one-third of its target price. An alternative included in this analysis is to base the DPP payment rate on the value of the product.

Figure 1 reveals that as yields decrease below the disaster level, gross income can be maintained only by a dollar-for-dollar substitution of disaster payment for market price. Under a disaster program where the payment rate equals the market or target price, all farmers who are eligible for disaster payments would have their loss cut to the same level regardless of their yield. In terms of figure 1, the line indicating gross returns with such a disaster payment rate would be horizontal at the level determined by the disaster yield. FCIC approximates this principle in providing indemnity rates to farmers that approximate current crop values.

Define the Disaster Yield to Cover Operating Expense

If the payment rate is based upon the value of the crop, then the primary way to change the level of protection afforded by the program is to change the disaster yield. Following this concept, it is reasonable to define the disaster yield at a level that covers operating expenses. This procedure is suggested by the FCIC practice of insuring farmers' returns at levels that would cover their normal investment in the crop. The necessary disaster yield for wheat, as shown in figure 1, is found by dividing the per acre operating expenses of $38.05 by the target price. The required wheat disaster yield is 16.6 bushels per acre. Defining the disaster yield in this manner, with the higher payment rate, would assure that gross returns, including the disaster payment, would equal production expenses at all yields below the disaster level. 13/

Alternative disaster yields have implications for the total cost of the program. Adjustments in the disaster yield are an effective means to change the amount of a farmer's cost that is covered by the disaster program.

Adjustments for Higher Market Prices

When the prices received by farmers increase relative to operating expenses, disaster payments can be reduced since fewer bushels are required to cover those expenses. Disaster payments may be reduced considerably during years with high market prices and still provide farmers with protection to meet their variable costs. This can be accomplished by basing coverage inversely on the market price. The disaster yield (yield at which eligible for payments) can be defined as the variable costs divided by the higher of (a) the target price or (b) the market price during the first part of the marketing season.

If target prices are viewed as a price floor with market prices generally above them, disaster payments would average considerably less under this modification. Although this feature may be difficult to administer because of its reliance on expected market prices, it could permit considerable savings in Government costs during years in which market prices are generally high. If prices are high, a lower

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13/ Such a program would be defined in terms of national yields, costs, and prices. This definition of a national program would provide consistency for all regions and all crops. The only adjustment that would be required for States, counties, and individual farms would be to modify the disaster yield to account for yield differences among farms, as is done with the current ASCS established yield. The appropriate U.S. average costs for each specific crop would be used.

yield can be tolerated without jeopardizing a farmer's ability to meet his direct production expenses. These changes would bring the program more in line with the philosophy that direct or variable production costs--but nothing more--should be protected by a disaster program.

With the disaster yield set at a level covering production expenses and the payment rate based upon the value of the crop, eligible farmers would receive payments sufficient to bring returns up to the sum of preharvest and harvest costs, regardless of their yield or the level of prices. However, there are valid reasons for adjusting the payment rate to provide lower returns for farmers with complete failures than for those who have yields closer to the disaster level. There are two reasons that this is desirable: (a) Farmers who receive a constant return as yields decrease have no incentive for harvesting part of a crop and decreasing the disaster payment, and (b) farmers with zero or very low yields may have proportionately reduced harvesting costs, thereby reducing their need for disaster payments. Because of these considerations, the payment rate for the DPP option evaluated was defined as the higher of the target price or the market price for the first 5 months of the marketing year multiplied by the proportion that preharvest costs are of operating expenses.14/ This adjustment allows the payment under a zero yield situation to equal preharvest costs.

Impact of a Modified Disaster Payments Program

The modified DPP evaluated here embodies the following alternatives: (a) No prevented planting payment, (b) payment based on the difference between the farmer's actual yield and his disaster yield, (c) a payment rate equal to the proportion of the crop value that covers preharvest costs, (d) the disaster yield defined as the quantity necessary to cover production expenses, and (e) the disaster yield is decreased in years of high market prices to reflect the reduced protection needs of farmers.

The nature of costs and gross returns for the average wheat farm under this program are shown in figure 6. Under low market prices, the disaster yield is 16.6 bushels, the amount covering preharvest and harvest costs. The payment rate is 80 percent of $2.29, or $1.83 per bushel. Gross returns for lower yields are represented by dotted line ab, which begins at $30.44 (with a complete crop failure) and increases to $38.05 (at the disaster level). Under a higher market price for wheat of $3.25 in this example, the disaster yield is computed as $38.05 divided by $3.25, or 11.7 bushels, as shown in figure 6. The payment rate is 80 percent of $3.25, or $2.60 per bushel. Gross returns, now represented by line ac, cover production expenses of the farmer even with a lower disaster yield because both prices and the payment rate are higher.

In summary, for years in which commodity prices are high, farmers do not need as much yield to cover their operating costs. Disaster payments may be reduced in such years. However, for years in which prices are at or below the target price, a higher yield is necessary to cover production costs, and the disaster payments are increased accordingly. In either case, the payment is adjusted to (a) provide farmers who have a complete crop failure with a payment equal to their preharvest costs and (b) provide a payment which brings gross returns up to the level of preharvest, plus harvest costs, at the disaster level.

14/ Because the published ERS production cost estimates do not separately show preharvest costs, these would need to be determined or could be approximated as a percentage of operating expenses. For this analysis, the preharvest cost was assumed to be 80 percent of operating expense.

GROSS RETURNS PER ACRE UNDER A MODIFIED DPP AVERAGE WHEAT FARM, 1976

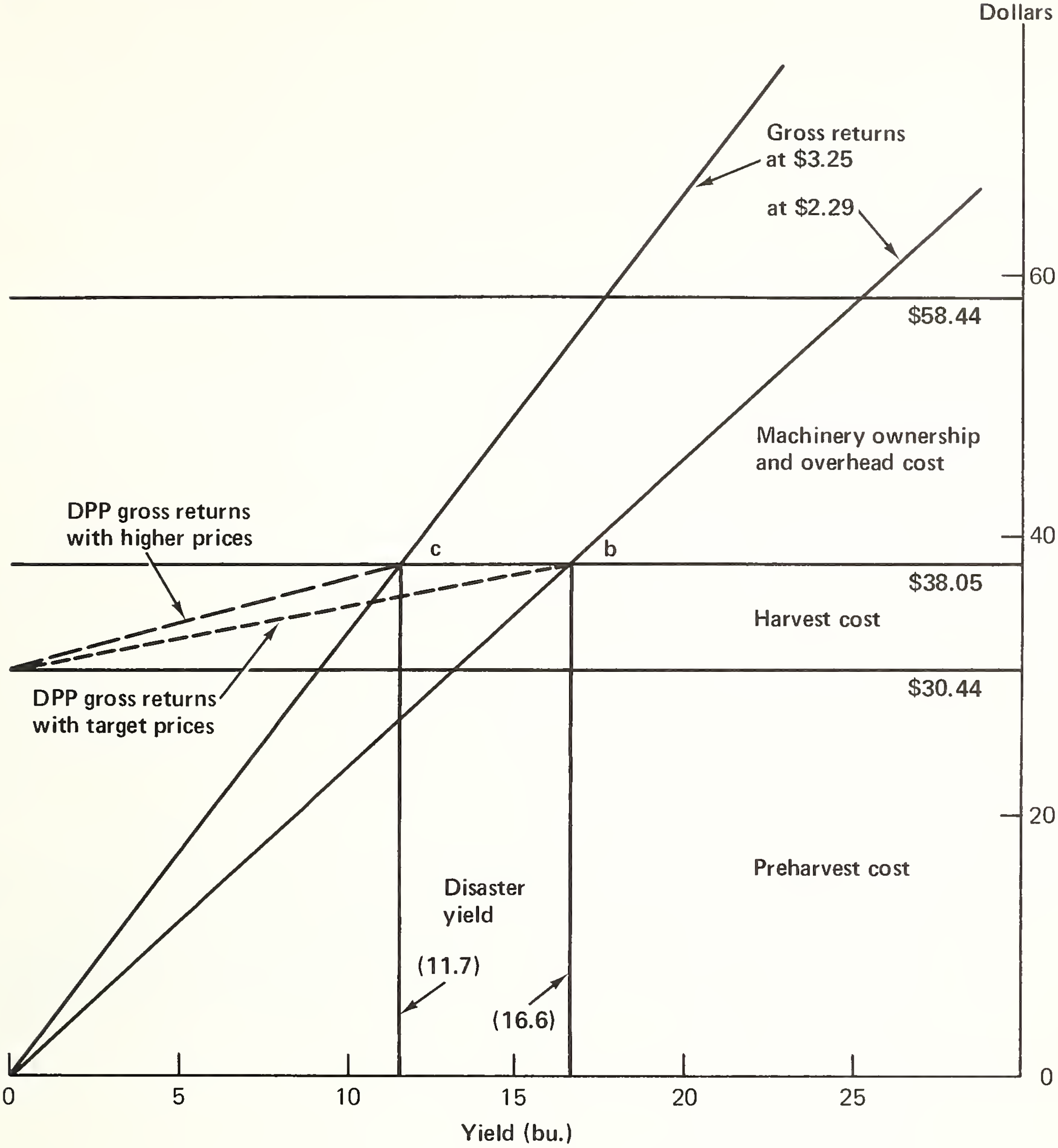

Figure 6

Costs and Coverage of a Modified Disaster Payments Program

A histogram of expected payments under the modified DPP, with market prices at or below target prices, is shown in figure 7. The program costs under this situation are not significantly different from costs under the present program. Comparison of figure 7 with figure 4 shows a high degree of similarity, but average payments are $18 million higher when commodity prices are at or below target prices (fig. 7). The modified program represents a basic reallocation of the same program costs associated with the current DPP in such a way that producers' operating expenses are met, regardless of their yield. For about the same costs to the Federal Government, this program configuration would appear to provide a more rational allocation of payments.

EXPECTED LOW-YIELD PAYMENTS UNDER A MODIFIED DPP, MARKET PRICE EQUAL TO TARGET PRICE, 1976

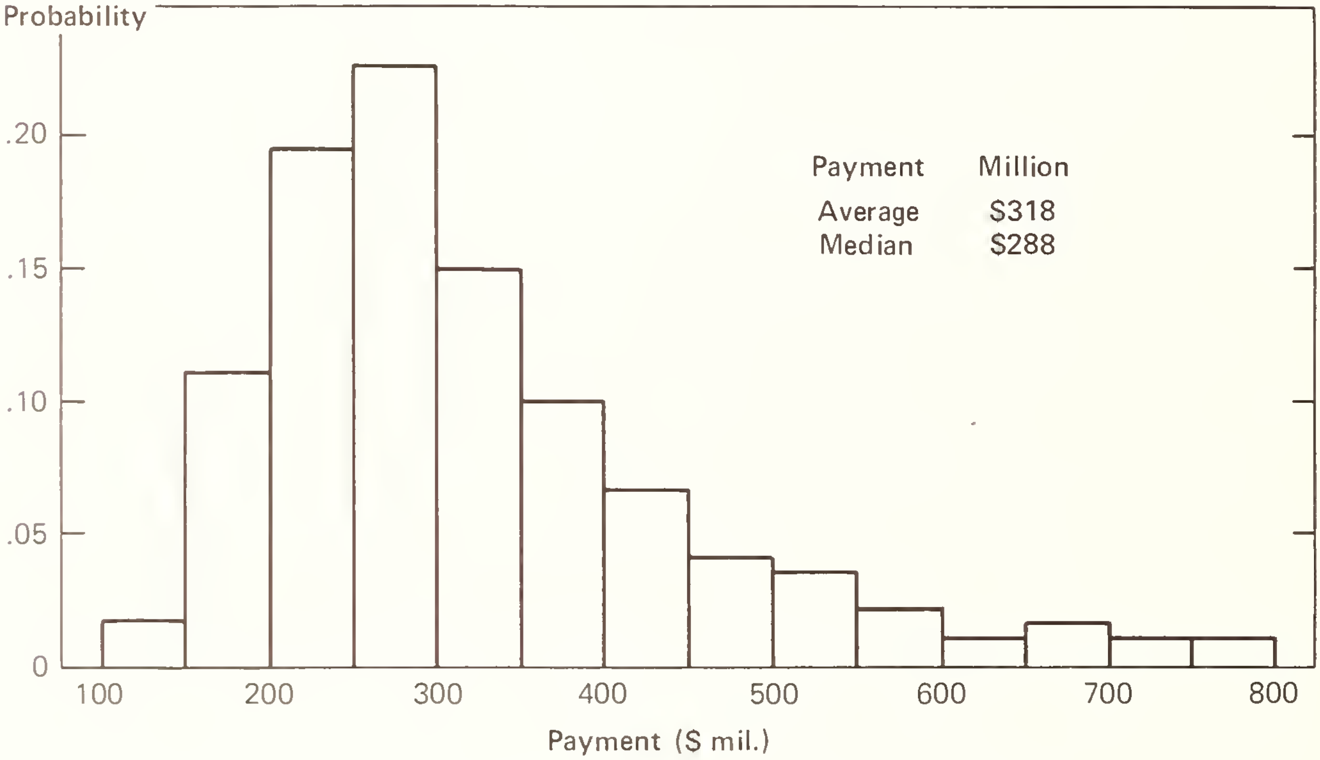

Figure 7

Program costs, when market price is at or below target price, are the highest that should be expected. The design of the program is such that a considerable cost reduction would be obtained during years with high market prices. For example, if 1976 market prices for the first 5 months of the marketing year averaged $3.25 for wheat, the disaster yield is decreased since fewer bushels are required to cover operating expenses. A considerable reduction in Government costs is achieved under these higher prices. The average expected payment is $145 million, with payments over $250 million expected only 2 percent of the time. Therefore, the costs of the modified DPP in years like 1976 when market prices are relatively high would be less than one-half of the costs of the current disaster program.

Over time, the costs of the modified DPP would depend on the year-by-year relationship between market prices and target prices. The continuation of the relatively high market prices during the last 3 years would provide a considerable savings in the costs of operating the disaster program. If market prices return to levels at or below target prices, the costs of the modified program would be comparable to the costs of the current program.

Decrease in the Protection Level

The modified DPP offers full coverage of the production costs to farmers in the event of crop failures. However, the costs of this program may be higher than society is willing to accept. If this is the case, it is appropriate to consider a means of reducing the protection level to bring costs within socially acceptable bounds.

A review of figure 6 suggests that the way to do this is to define the disaster yield at some lower level that would cover less than the full operating expense (say, 90 percent of the operating expense). That is, the disaster yield could be defined as the yield necessary to cover 90 percent of a farmer's operating expenses. Such a program configuration would reduce the protection offered to farmers. However, it would bring about a considerable reduction in the costs of operating the program because the most probable yield losses are those that are closer to the average yield and as the disaster yield is reduced further below the average, it becomes less and less likely that a loss will be incurred. Therefore, a small decrease in the disaster yield results in a much larger decrease in the number of farmers eligible for benefits.

Under a DPP covering 90 percent of operating expenses, the average payment is $233 million, $85 million less than under the full coverage program. Only 1 percent of the payments under this program would be over about $500 million. This analysis suggests that a 10-percent decrease in the level of protection offered farmers has the potential of decreasing program costs by more than 25 percent. If needed, this concept could be used to reduce program costs to a level that would be acceptable, and over a period of years, the concept could be used to identify and adjust the program coverage to a level that best balances the protection offered to farmers and the cost to society.

Revision of Allotments and Bases

As described earlier in this report, a major inequity in the current DPP is that production on nonallotment acreage makes otherwise eligible producers ineligible for disaster payments. Since the allotments and bases that ASCS uses for disaster payment computations are based primarily on historical acreages, recent geographic shifts in production, as well as higher production levels, have resulted in much crop acreage being outside of allotments and bases. Since DPP benefits are based upon the difference between actual production and the farm's established allotment or base production, these producers are either ineligible or eligible for benefits only in the most extreme crop loss situations.

One solution to this problem is to update all allotments and bases to a more recent period. Two alternatives would be to define a new allotment that equals the

1974-76 average acreage (a period in which there were no production controls for the program crops) or the 1976 acreage, which is the most recent annual information available. Since this allotment or base is also used for computation of deficiency payments under the 1973 Act, there are probably additional considerations that enter into its definition that are beyond the scope of this report. It appears that operation of these programs requires that ASCS undertake the large effort and expense involved in determining an updated allotment and base for each farm in the United States.

Updating allotments and bases to the current period would provide many more farmers with DPP coverage. Unfortunately, it is impossible to make a precise estimate of how much such additional coverage would cost without a detailed survey of the current relationship between planted acreage and allotments by major types of farms and by different geographic regions. Based on the model used in making the estimates of average program costs in this report, it appears that the costs of the wheat, corn, grain sorghum, and barley Disaster Payments Program could be increased by more than $100 million if allotments and bases were redefined as the 1976 planted acreage.

No comparable estimate is available for the increase in cotton disaster payments. Other than this higher cost, there appears to be little argument for limiting disaster protection to farmers who had crop acreages during the historical periods. Allotments and bases are not a requirement for FCIC eligibility.

LIMITING OVERLAP BETWEEN FEDERAL CROP INSURANCE AND DISASTER PAYMENTS

Even with revisions in the DPP developed in the previous section, a problem of overlap still exists between the DPP and the FCIC program. While FCIC participation rates have not yet declined, continued eligibility for DPP may make farmers less inclined to purchase FCI than if the DPP were not available. Also, an undetermined number of farmers receive payments under both programs for the same loss.

Methods of Eliminating Overlap

Two methods have been proposed to eliminate overlap between the programs and producers receiving double payments for the same loss. The first method is to retain both programs, either in the current form or as modified earlier, but to require producers, for eligibility in the DPP program, to have at least a minimum level of FCI insurance wherever such insurance is available and to limit DPP payments to the difference between a producer's computed loss and his FCIC indemnity. This method would eliminate the overlap between the two programs, but would involve a considerable amount of monitoring and coordination between FCIC and ASCS (18, p. 42). It is not known how such a requirement would affect FCI participation or payments under the DPP.

A second method of limiting the overlap between the FCI and DPP is to retain FCI and strengthen it in areas already served. Disaster payments could then be used to permanently cover high-risk areas not feasibly served by crop insurance. The philosophy for this method derives from the basic difference in the nature of natural hazards between current FCI areas and high-risk areas outside the FCI program. Historically, FCI has served areas where natural hazards to crops are insurable with an economically sound program, and has been excluded in areas where the risks were so high that an economical program could not be offered.

Table 6--Estimated 1976 level costs and coverage of a nationwide modified DPP, compared with a modified DPP in high-risk areas

Area and coverage	Current FCI Nationwide modified DPP	Intensive FCI 25 percent subsidy Modified DPP in high-risk areas
	Million dollars	
CURRENT FCIC AREAS:[1]		
Premium subsidy	--	35
Producer premiums	49	105
Total premiums	49	140
Liability	913	2,497
Indemnities	45	126
DPP:		
Liability	4,881	--
Payments	246	--
OTHER HIGH-RISK AREAS		
DPP:		
Liability	400	400
Payments	72	72
TOTAL ALL AREAS		
FCIC:		
Sales activity	1	12
Other operating cost	11	28
Premium subsidy	--	35
Total FCIC cost	12	75
Disaster payment cost	318	72
Total Government cost	330	147
Both programs:		
Liability covered	6,194	2,898
Disaster payments and indemnity	363	198

[1] FCIC participation rate is 17 percent for the nationwide modified DPP; 40 percent for the modified DPP in high-risk areas.

Under this option, the FCI sales effort would be expanded and a premium subsidy of 25 percent could be used to increase the level of protection provided in the areas currently served. A modified DPP of the type discussed in the previous section of this report would be made available to farmers in all other high-risk areas.

Estimated Coverage and Costs of Limited Disaster Payments

Table 6 shows the coverage and cost estimates for the option limiting disaster payments to high-risk areas and subsidizing FCI in current areas. For comparison, the nationwide modified DPP described in the previous section is also shown. In the current FCIC areas, FCI coverage is expanded from 17 to 40 percent of the farms, increasing the average indemnity from $45 million to $126 million. However, disaster payments, estimated at $246 million annually, are eliminated in current FCIC areas under the option to limit overlap. In high-risk areas currently excluded by FCIC, disaster payments averaging $72 million are made under both options.

Government costs are much less when the overlap between the two programs is eliminated. Estimates in table 6 indicate that program costs, when the overlap is eliminated, are $147 million, compared with $330 million. Disaster payments and FCIC indemnities to producers are reduced from $363 million to $198 million because 60 percent of the farmers in the current FCIC areas are not covered under the second option. As a result, the savings in costs obtained by limiting overlap between the two programs under this option must be compared to the substantial decrease in coverage provided farmers. Although it is not clear how much double payment and overlap currently exist between the two programs, it is probably considerably less than the current $45 million in FCI indemnities (table 6). The program option that eliminates this double coverage decreases farmer payments and indemnities by $165 million--a substanital decrease in payments to agriculture.

WELFARE IMPLICATIONS OF PREMIUM SUBSIDIES AND DISASTER PAYMENTS

Discussion of the welfare implications of premium subsidies for insurance and the DPP will cover the performance consequences of these programs, the parties incurring the costs and receiving benefits of these programs, and how economic conditions affect the type and level of Government expenditures. Each policy option discussed in previous sections of this report will differ with regard to specific implications. The following evaluation of welfare implications is more general in nature.

The continuation or revision of FCI and the DPP represent changes in the basis on which many farmers make production decisions. Several of the changes or performance consequences of these policies are in areas of importance to the agricultural production sector. A major consequence of these policies is their stabilizing influence on farm income. That producers are assured of recovering, at minimum, preharvest operating costs also facilitates longrun stability in the production of agricultural products. Similarly, although production losses may occur in succeeding years, the farmer's incentive to continue production is maintained if these costs are covered. Other economic conditions are important, but this result would add to the stability of agricultural commodity prices and an adequate food supply.

The income stabilizing effect of these programs extends beyond the production unit to the rural community. The payment of loans and bills, even when crops fail, is one measure of the effect of these programs on the stability of income in rural communities.

A performance consequence related to economic stability in the agricultural production sector is the maintenance of agricultural production capacity. Given the existing or possibly revised structure of these programs, the incentive exists for producers to maintain the same level of land utilization and planned capital investment. The impact on high-risk production areas would affect both land and capital utilization, and thereby increase agricultural capacity.

The extension of disaster payments or an insurance subsidy in high-risk agricultural production areas has several important consequences. These policy options encourage, where allotments permit, the use of high-risk or marginal land. If yields are good, there may be downward pressure on prices. Whether commodity prices are significantly reduced will depend on the additional acreage brought into production. While consumers benefit from reduced prices, producers in low-risk areas are adversely affected by the market effects of these policy options. Also, direct Government subsidies to cover the risks associated with producing crops in these areas may be a more effective policy instrument to increase U.S. production than policies that emphasize increased production elsewhere.

Whether these programs have a favorable or unfavorable impact on the allocation of national resources and income distribution is dependent on many factors and the types of costs and benefits included. If the U.S. and the world food situation are such that increased demands are placed on existing agricultural capacity, the cost of policy measures causing additional resources to be brought into agricultural use can be justified. During periods of increasing demand for U.S. agricultural products and rising product prices, the effects of these programs on income transfers within the agricultural sector are minimized.

To summarize the welfare implications of the DPP or premium subsidies, it has been indicated that rural communities and consumers benefit from policies aimed at protecting producers from risks associated with agricultural production. Income transfers among producers because of market effects of increased production and agricultural capacity are possible. The extent of those transfers will depend on economic conditions in agricultural markets. Others within the agricultural sector, such as input suppliers, would also benefit.

The costs of these programs are borne by the taxpayer, and as such are a transfer into the agricultural sector. The level of such transfers will depend on economic conditions; if demand for U.S. agricultural products is maintained and commodity prices are higher than target prices, Government expenditures for these programs will be reduced.

CONCLUSIONS

This report did not explicitly treat the question of whether the Federal Government should or should not offer agricultural producers protection against loss of income when crops are damaged by natural disasters. Rather, it followed the premise that if such a judgment is made that protection should be offered, the options available to policymakers need to be evaluated. Five major options were evaluated: (1) Extension of the current DPP and FCIC programs, (2) aid to the private insurance industry, (3) a national FCI program with a premium subsidy, (4) modification of the DPP, and (5) elimination of the overlap between FCI and the DPP.

Depending upon the particular goals of policymakers, some of the options are more appropriate than others. However, none of the options are clearly superior when measured against the range of major criteria that could be used in the selection process.

Since none of these options are categorically superior, selection of the best policy option involves consideration of the tradeoffs. Table 7 provides a summary of the major options evaluated in this report as measured against some reasonable criteria of performance. The criteria used include the proportion of the five program crops covered by disaster protection, the dollar liability of this coverage, total disaster payments and indemnities to farmers, premiums paid by farmers, and costs to the Federal Government. The option of extending the current programs is shown in the first row of the table, followed by the other three major options in order of increasing Federal Government involvment.

Extension of the current Government programs provides the benchmark of comparison for the other options in table 7. The coverage provided by the current programs is in the neighborhood of 70 to 100 percent, depending on the actual values of two unknowns: the extent of DPP limitation because of its reliance on out-of-date allotments and bases, and the amount of overlap between the FCI and the DPP. Based on 1976 estimates, this option would have provided $6.4 billion in liability coverage and payments, and indemnities to farmers would have averaged $373 million. For this coverage, farmers would have paid a premium of $49 million to the FCIC, and Government costs would have averaged $340 million.

In terms of the other options, aid or subsidies to the private insurance industry represent an attempt to minimize the direct role of the Federal Government in crop insurance. However, estimates concerning the performance criteria for this option are not available. It is expected that coverage would be lower than under any of the other options; however, Government costs would also be lowest under this option unless sizable direct subsidies are used to increase the volume of business.

The national FCI program, with a 25-percent premium subsidy, would have protected about 40 percent of the acreage of the program crops, covered $2.7 billion liability, and provided loss payments of $163 million to farmers in 1976. In turn, this program would have cost farmers $135 million in premiums and the Federal Government $97 million in administrative costs and subsidies. The coverage of a national FCI program would be expanded to 47 percent of the acreage of the program crops by increasing the premium subsidy as shown in the next row of table 7; this larger subsidy would increase Government costs to $126 million.

The fourth option, which represents a nonoverlapping combination of the DPP and FCI, would reach 53 percent of producers of program crops, and would cost the Federal Government $147 million. Premium costs to farmers would be reduced by almost one-third, and Federal Government costs would be increased since no part of program costs would be paid for disaster protection in high-risk areas under this option.

Table 7 shows the option extending the current FCI program and modifying the DPP to correct some of its inherent problems. The dollar value of the coverage is comparable to that of the current programs, as are the Government costs. As discussed earlier in this report, the cost of this option could be reduced by decreasing the coverage on an individual farm to, say, 90 percent of the harvest and preharvest costs. Alternatively, the coverage would be expanded and the cost increased by updating allotments so that disaster payments would be available on all planted acreage. The coverage and costs of a program with realistic allotments could be from 20 to 40 percent higher than those shown for the modified DPP and the current FCI (table 7).

In terms of the types of hazards described at the beginning of this report, the different levels of coverage in table 7 are not evenly distributed among farmers. Rather, the programs with low Government involvement tend to benefit farmers in low-risk areas where risks to growing crops are insurable by an insurance program with reasonable premiums. High-risk areas and types of agriculture are generally excluded from coverage under these options. The higher levels of Federal involvement shown in table 7 basically represent an increase in the level of protection offered high-risk agricultural areas and the uninsurable hazards discussed in the introduction. The high-risk areas in agriculture are covered best by the DPP options.

There is an argument for protection from severe economic losses if crops are damaged by natural disasters. Insurance or protection from severe income losses would reduce the disinvestment in natural resources and capital resources specific to agricultural use. An impact of this nature also provides security to research and finances technologically improved inputs and production processes. These improvements have historically reduced food costs and increased farm efficiency. Stability in the agricultural sector of the economy reduces the likelihood of drastic changes in relative prices, wages, and investment activity in that sector and areas in the general economy dependent upon agricultural activity.

The protection of producers against severe income losses benefits producers, rural communities, and agribusines. Consumers benefit by having access to adequate supplies of food at reasonable prices. However, this study did not attempt to quantify the relationship between the coverage provided producers and the amount of benefits received by these groups. This relationship must be handled through the political system by a subjective weighting of the various program criteria shown in table 7. The remaining step is to choose the level of protection that can reasonably be provided agriculture in view of the perceived and measured benefits of the programs, and in view of the need to control Government expenditures.

Table 7--Measurement of Government disaster payments and insurance options by performance criteria for program crops, 1976 level costs

Options[1]	Performance criteria				
	Program crops covered[2]	Liability covered	Disaster payments and indemnities	Premiums paid by farmers	Government costs
	Percent	Million dollars			
Extension of current FCI and DPP	70-100	6,394	373	49	340
National FCI program with a-25 percent premium subsidy	40	2,700	163	135	97
25/40 percent subsidy	47	2,980	189	144	126
FCI and DPP without overlap	53	2,898	198	105	147
Modified DPP and current FCI[3]	70-100	6,194	363	49	330

[1] Comparable estimates are not available for inducements to private industry.
[2] Wheat, corn, grain sorghum, barley, and upland cotton.
[3] The costs shown here represent the situation when market prices are at or below target prices. Costs would be up to 50 percent less under actual 1976 market and target price relationships.

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